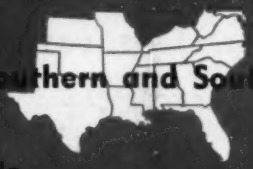
ELECTRICAL SOUTH



Serving the 18 Southern and Southwestern States

How scheduled maintenance will help to maintain high level of production

MARCH, 1954

Something NEW in Air Conditioning!

HUNTER ROOM CONDITIONER

brings you the remarkable

ROTO-DISC DIRECTOR*

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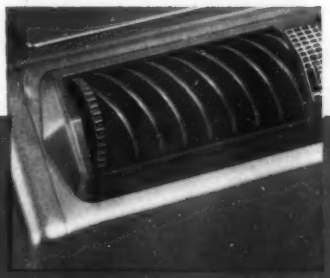


FINGER-TIP DIALING DIRECTS AIR FLOW no grilles to twist and turn
MODERN BEAUTY
CLEAN FILTERED AIR
NO-DRAFT COOLING
QUIET OPERATION

HUNTER ROOM AIR CONDITIONERS • 1/2 TON • 3/4 TON • 1 TON

A few of the many Hunter features

Easy installation
Double-baked DuPont finish
2-speed motor
Tecumseh compressor

- Thermostatic control
- Permanent-type filter
- U. L. Approved
- 5-year warranty

Write or wire for data and prices

Hunter SINCE 1886

HUNTER FAN AND VENTILATING CO.

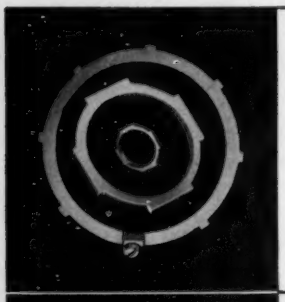
392 S. Front St., Memphis 2, Tenn.

Specialists in cooling and ventilating since 1886

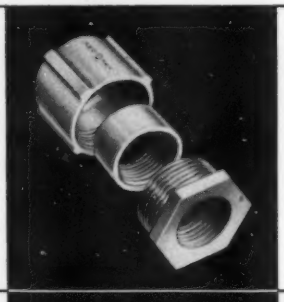
ANY FITTING YOU CAN THINK OF!

Gedney's got it... in malleable iron... accurately machined ... quickest, least costly to install

IT'S RIGHT THERE in the Gedney line... every fitting that you need for every sort of installation! And Gedney fittings are accurately machined and threaded... made of unbreakable malleable iron... individually inspected to assure you the lowest installed costs obtainable today! Always order Gedney fittings and you'll *always* make maximum savings of time and money.



CONDUIT LOCKNUTS — sizes from ⅜" to 6". Sizes ⅜" to 1½" are made of heavy nut lock steel... all other sizes, malleable iron. All sizes cadmium plated. Also bonding wedge locknuts, ½" to 6".



3-PIECE CONDUIT COUPLINGS — come in a large range of sizes from ½" to 6". Malleable iron, cadmium plated.

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Volume 34 Number 3

The answer to complete lighting flexibility

Fluorescent lighting on Universal Trol-E-Duct installation at Ford Motor Company's Buffalo Stamping Plant, Hamburg, New York

FORD MOTOR USES TROL-E-DUCT® —6¼ MILES OF IT!

BullDog Universal Trol-E-Duct lets Ford add, move or remove lights anywhere, anytime, without rewiring. Here's true flexibility that meets any requirement from a fixture change to a completely new floor layout.

Every rugged inch of durable BullDog Trol-E-Duct provides available easy-to-tap current. Simply slip twistout plug into continuous slot—instantly you get a positive connection without disrupting power. What's more, the 50-ampere rating of the copper bars assures ample provision for future growth.

Prefabricated duct sections install easily, quickly with only a screw driver. Can be dismantled and installed elsewhere, with never a wasted part.

For the answer to your lighting problem, check with your local BullDog Field Engineer. Or write for free bulletin UT-650. BullDog Electric Products Company, Dept. ES-34, Detroit 32, Michigan.

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ELECTRICAL SOUTH

SERVING THE 18 SOUTHERN AND SOUTHWESTERN STATES

March, 1954 — Vol. 34—No. 3

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TO HELP THE BUSY READER—

In the **Electrical Data Sheets**, beginning on **page 46**, several sheets are presented in the first of the series on **Electrical Estimating.** These valuable estimating aids reprinted by special permission from Sherlock's *Blue Book of Electrical Estimating* will appear each month and will cover a wide range of labor cost data for the installation of electrical wiring materials and devices.

The author, George L. Sherlock, is well qualified in the field of electrical estimating. He operated his own successful electrical contracting business for many years. During World War II, he became electrical maintenance foreman for one of America's largest aircraft plants. On this job he had an excellent opportunity to gather time study data on hundreds of different kinds of electrical jobs.

After the war, Mr. Sherlock became chief electrical estimator for one of the largest mail order companies, and in this capacity he reviewed bids for new buildings and alterations on stores, offices, and warehouses. This work brought him additional opportunities to accumulate time study data on electrical installations. During this period he traveled throughout the country, and enjoyed the benefit of personal contact with electrical contractors, engineers, architects, estimators, and journeymen. A particular advantage of his tabulations of labor cost data for electrical installations is their simplicity.

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ANHYDREX *The cable with the built-in* Galoshes..

Snow, slush, and rain call for galoshes. You might catch pneumonia if you leave them home. Your power cables need galoshes, too. They can't catch pneumonia, but if they get wet enough they'll eventually need expensive doctoring. ● Simplex-ANHYDREX Cable has those galoshes. They're built-in in the form of Anhydrex insulation. Anhydrex insulation is guaranteed not to absorb more than 20 milligrams of distilled water per square inch after 7 days' immersion in 158° F. (70° C.) water. It is the most stable rubber insulation when exposed to water and moisture. ● Besides its notable low water-absorption characteristics, Simplex-ANHYDREX Cable is unaffected by summer heat and winter cold. It won't crack under vibration and is highly resistant to acids, flame, grease, and oil. ● Your Simplex representative has more information about the cable with "the built-in galoshes" — Simplex-ANHYDREX Cable. Ask him about it.

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SIMPLEX WIRE & CABLE COMPANY

79 Sidney St., Cambridge 39, Massachusetts

Economic comment

by J. Whitney Bunting, Ph.D.

Unemployment shadow

The old saying that "coming events cast their shadows before" has led to much debate and discussion in regard to the unemployment situation now present in our national economic picture. Does the fact that the number of idle workers is slowly, but steadily, increasing show any indication of a sharp drop in business activity around the corner? Does it mean that this figure, roughly two million persons in the present labor market, will continue to mount at the present pace until such figure might have disastrous effect upon consumer demand for business production?

Both questions are of great significance from the point of view of economic progress. Both questions, when answered in terms of best available economic knowledge, will lead to a positive governmental policy of economic assistance that can have widespread effect and repercussions upon the daily lives of all American citizens.

There is no reason to assume that the present unemployment condition itself is cause for alarm or for a radical upheaval in governmental economic policy. It does mean that serious and constructive thought should be given to all factors contributing to this condition with a view to understanding causes and developing controls therefore.

Adjusting periods necessary

Unemployment, serious as it may be to those directly and indirectly affected, is a resultant factor of economic dislocation and should be treated as such. One must realize that a good economic system that can show progress must be a dynamic one. Consequently, if the concept of dynamics must be accepted to show potentialities of progress, then periodic adjusting periods with some unemployment can also be anticipated. Unemployment is always a factor of importance to a greater or lesser degree when any period of business readjustment occurs.

Dr. Bunting, well-known southern economist, is president of Oglethorpe University, Oglethorpe, Ga.

Seasonal factors

The months of January and February are usually poor from the standpoint of employment. It is in this period that many industries take time to reschedule production quotas. Other firms may retool for new models of the equipment they produce. Still others find post-Christmas markets glutted with bargain sales and withhold production until a normal price structure reappears.

These months are in the slowest agricultural period too, and it is at this time that much shifting of agricultural labor to industrial jobs occurs. During the Christmas buying period many people are attracted into clerical and sales jobs, temporary in nature, but hate to give up the pay checks when the need is over. Thus, they continue to try to remain gainfully employed. All of these factors, plus others of lesser importance, tend to minimize the importance of unemployment data at this particular time.

Administration policy on the national level has been directed toward economic assistance only as a last resort, believing industry itself should shoulder the burden of controlling economic conditions. This policy is difficult for many people to absorb since over twenty years of governmental control of economic life has been in force during previous administrations. It will be some time yet before the American nation can take such changes as the increase or decrease in rate of employment in stride without forseeing all manner of depression or recession in sight.

One must not lose contact with the fact that the administration is ready to enter the picture with specific corrective action in the event that business itself cannot control its health. As in 1932, we should fear most the development of a "fear complex."

Price downturn—when?

An investigation of the price pattern as of the present moment shows a fairly stable level on a high plateau for most economic goods. At least this condition is apparent on the face of things. However, there is ample evidence of some cracking in the supports of such prices, whether such supports are governmental (such as in agriculture) or purely competitive (as in most industrial items).

A recent national retail convention reported the rapid growth of purchasing clubs, co-operative buying units, and across-the-counter-selling types of wholesale outlets. The remarkable growth of these units in the past two years illustrates the acceptance that most people have for the doctrine of "cost-plus-ten-per-cent" buying today. In fact, it would appear that the so-called "legitimate" retailer may find his mark-up policies seriously affected by this new competition.

Various large retailers, particularly those that distribute heavy durable goods find themselves in competition, one with another, in the granting of "kick-backs" to customers in order to get bonuses. Automobile dealers in some areas offer new cars several hundred dollars below current list prices. An old car as "trade-in" need not even enter the picture.

Store-wide "sales" increased

Recent studies in large urban areas show a very marked increase in the number of store-wide sales featuring regular merchandise at greatly reduced prices. One appliance merchandiser publicly offers any product that he carries in his normal stock at a price at least one-third below regular retail list. This condition usually precedes a general softening of prices on all lines of consumer goods and through all types of normal retail outlets. And yet the Bureau of Labor Statistics still

(*Continued on page* 90)

NOW... you can use genuine SANGAMO QUALITY Time Switches for all of your jobs!

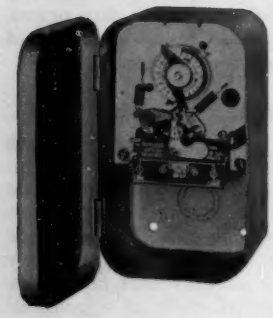
At last you can use a really top quality time switch that will assure satisfactory performance on every installation—even those that call for the least expensive equipment. The new Sangamo Type B Time Switch, that costs only a fraction more than the very lowest priced time switch, puts Sangamo Quality within the reach of all.

It's rated at 30 amperes, and will open an entirely new range of applications for single-pole single-throw time switches.

Get this sensational value at your electrical wholesaler's today—try the new low priced time switch that will wipe out the service call headache and the need for defective switch replacement.

STURDY ALL-STEEL CASE

The new Type B is enclosed in an attractive all-steel case with a hinged cover that can't be misplaced and a sealable hasp for protection against tampering. There is no glass window to break accidentally. Overall dimensions—7¼" high, 4¼" wide, and 3⅛" deep.



PLENTY OF WIRING ROOM

Type B is a cinch to install! Almost one half of the inside space available for speedy wiring, four convenient ½"—¾" multiple knockouts and a keyhole slot in the back permit neat, fast, labor-saving installation.

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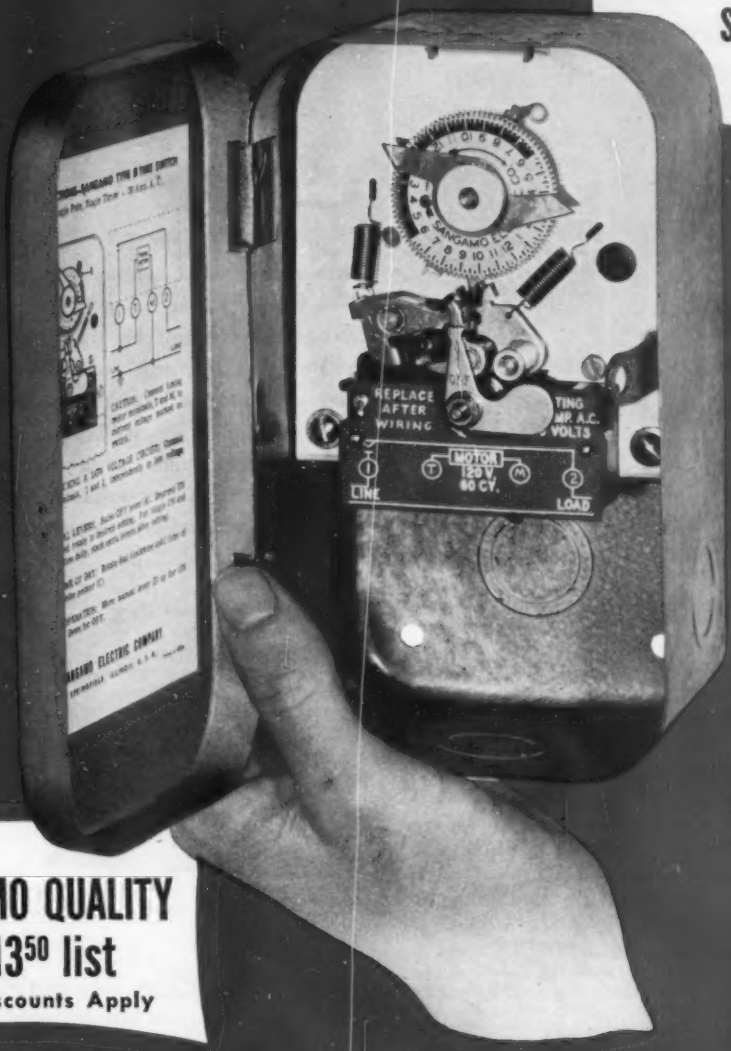
ST54-1

SPRINGFIELD, ILLINOIS

30 AMP. RATING
Single-Pole
Single-Throw

EASY TO OPERATE
Setting dial is simple and the two "on" or two "off" trippers can be hand tripped without disturbing automatic operation.

DEAD FRONT SAFETY
The dead front insulating shield that eliminates exposed wiring and exposed contacts gives protection against accidental shocks.



WORKS BETTER
Sangamo-proved timing mechanism runs quietly and efficiently and requires no maintenance.

INSTALL IT AND FORGET IT!
The reliable Sangamo slow speed motor stops service calls, but it won't stop in coldest winter or hottest summer.

LASTS LONGER
NEMA Standard 30 ampere rating. Long life heavy silver contacts mean minimum arcing for maximum performance.

SANGAMO QUALITY
at $13.50 list
Trade Discounts Apply

the NEW Sangamo Type B Time Switch has EVERYTHING YOU'VE BEEN WANTING in a low-priced switch!

Type B truly represents well-known Sangamo Time Switch Quality. It is powered by the same slow speed motor that powers Sangamo heavy-duty time switches. It is built with the same Sangamo precision that assures dependability, accuracy, and long lasting troublefree performance. And, it carries the same liberal 18 month guarantee that backs any other Sangamo Time Switch. Give yourself—and your customers—a break by using the Type B on all jobs where price must be considered.

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EASY INSTALLATIONS . . . smooth way to

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Correct answer to exhaust air problems in the modern home. Either types HAT or PAT Ventilattic Exhaust Fans can be installed vertically or horizontally. Design is compact. Units are of welded construction. Installation is quick, easy and economical. Type HAT is equipped with an automatic ceiling shutter to provide required inlet air velocities. Shutter attachment includes fusible link for fire underwriters' requirements.

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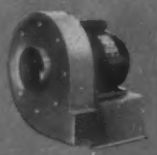
DIRECT DRIVE EXHAUST FAN 2150 TO 7375 CFM

DIRECT DRIVE WITH INLET GUARD 400 TO 1780 CFM

DIRECT DRIVE UTILITY BLOWER



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Peerless Electric

CATALOGS and BULLETINS
Available Free to Readers of
Electrical South upon Request
(Additional items will be found on page 11)

1011—Conduits. "Natural Electric Conduits" is the title of the 30-page Catalog No. 603 which describes and illustrates the many types of electrical conduits that are manufactured by National Electric Products Corp., 2 Gateway Center, Pittsburgh 22, Pa.

1015—Squeezon Connectors. The Squeezon, a new compression connector for power lines, is fully described in bulletin, "SQ" available from the James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo. The Squeezon features greatly increased electrical and mechanical efficiency at approximately half the cost of conventional connectors.

1019—Service Panels. Information on protective electrical control centers for homes, apartment buildings, service stations, and industrial applications is contained in Bulletin PM-355, "BullDog Pushmatic Electric-Centers," issued by BullDog Electric Products Co., 7610 Jos Campau, Detroit, Michigan.

1051—Transformers. "Care and Maintenance of Marcus Dry Type Transformers" manual No. M-100 goes into a complete description of the proper method of installing dry type transformers, particularly Class B, in all of the sizes which dry type transformers are available today. In addition, the proper maintenance methods for insuring long life and interruption free service are described. There is also a section included on the protection of dry type transformers against surges due to lightning, switching, etc. Marcus Transformer Co., Inc., 32-34 Montgomery St., Hillside, N. J.

1071—Plugs and Receptacles. Additional loose-leaf sheets for insertion in the Pylet Catalog 1100 are available from the Pyle-National Co., 1354 N. Kostner Ave., Chicago 51, Ill. These pages describe a wide range of plugs and receptacles for special purposes.

1079—Washer Lugs. Krueger and Hudepohl, 3 E. Third St., Cincinnati 2, Ohio, in their Bulletin 8-DF, give information and catalog listings for their complete line of K&H solderless terminal folding double cupped washer lugs. The folder explains uses and applications of all the lugs.

1081—Busduct Data. Various applications of the FA busduct for industrial purposes are illustrated in this bulletin made available by the Frank Adams Electric Co., P. O. Box 357, St. Louis, Mo.

1085—Lighting Fixtures. Eastern presents their most complete catalog, 32 pages of engineered lighting data, including a variety of fixtures for all architectural, commercial and industrial applications. Eastern Fixture Co., Inc., 170 Vernon St., Boston 20, Mass.

1087. Fittings. The M. & W. Electric Mfg. Co., Inc., East Palestine, Ohio, has available their new 28 page catalog 53, covering Service Entrance Mast Fittings, Service Entrance Cable Fittings, Ground Clamps, Rods, BX and Romex Connectors, Conduit Fittings, Wireholders, Insulator Supports and Cable Racks.

1097—Flexible Cords and Cordsets. A complete 48-page catalog is available from the Cornish Wire Company, 50 Church Street, New York 7, N. Y. containing all data on flexible and portable cords, lamp cords, heater cords, cordsets, radio and electronic wires.

1099—Lighting Fixtures. Fluorescent and incandescent luminaires for schools, offices, stores and factories are illustrated in a series of bulletins issued by Curtis Lighting, Inc., 6134 West 65th Street, Chicago 38, Ill. The entire series or any individual bulletins may be obtained upon request.

1103—Electrical Connectors. Burndy Industrial Catalog 52, featuring a complete line of general-purpose connectors for industrial wiring is available. Complete information concerning application, construction features and dimensions of these connectors are included, as well as several pages devoted to engineering data. Published by Burndy Engineering Co., Inc., 107 Bruckner Blvd., New York 54, N. Y.

1107—RHW "The Ampere Squeezer." Booklet explains visually the effect of ambient temperatures on current carrying capacities of RW and RHW Wire. New RHW Wire Underwriters' Laboratories approved for general purpose wiring in WET or DRY locations at 167°F. Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.

ELECTRICAL SOUTH
806 Peachtree St., NE
Atlanta 5, Ga.

March, 1954

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There's more to lighting than just fixtures and lamps . . . just metal, glass and wire. Selling or specifying better lighting is human welfare work: greater comfort for tired eyes—preservation of eyesight—better working conditions—more pleasant surroundings. It also means: no more torturing eyestrain—less fatigue—less nervous tension—better postures—a healthier disposition.

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it's the eye-comfort that counts

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Leaders in Lighting since 1902

1109—Anchoring and Drilling Devices. An illustrated 32-page catalog No. 65, describing more than twenty-five anchoring and drilling devices for making fastenings to masonry, is available from the Arro Expansion Bolt Company, Marion, Ohio.

1115—Remote-Control Wiring. An eight-page, non-technical booklet on remote-control wiring, publication No. 16-330, written expressly for the consumer, is available from the G.-E. Construction Materials Dept., Bridgeport 2, Conn. The booklet gives a picture story on the convenience, safety, and economy of this new wiring method.

1117—"Modern Air Cooled Fluorescent Fixture." Offering beauty, efficiency, and flexibility is provided by PEER LITE. New 8-page booklet for lighting specialist, giving complete engineering data and dimension is now available. Write Edwin F. Guth Co., 2615 Washington Blvd., St. Louis, Mo.

1131—Fluorescent Units for Slimline Lamps. This new, illustrated, 20-page bulletin gives complete specifications of general purpose, "Magna-Flo" lighting systems for 96, 72 and 48-inch, T12 Slimline lamps. Describes individual units and continuous line systems plus accessories. 8½" x 11" page size. Write Benjamin Electric Mfg. Company, Des Plaines, Illinois, and ask for bulletin "mf."

1133—Vaportight Fixture. New Appleton "V-51" Series Convertible Vaportight Lighting Fixture is fully described and illustrated, for pendant, ceiling or bracket mounting, with or without reflectors and guards. Wattages, weights and dimensional data. Bulletin 5-A, 20 pages and cover. Appleton Electric Company, 1701-59 Wellington Avenue, Chicago 13, Ill.

1135—Electrical Wiring Devices. Catalog No. 51, containing complete electrical wiring device line of Leviton Mfg. Co., Brooklyn 22, N. Y., is a 96-page thoroughly illustrated one. Included are such features as the Kwik-change line, with wiring diagrams, a general index, and an index to catalog numbers. This catalog is completely new and revised. Over 1,000 items illustrated.

1149—Insulators. Victor Insulators, Inc., Victor, N. Y., has available a complete catalog of Victor high, medium and low voltage insulators and line hardware. Complete contour shapes, dimensions, specifications and engineering data are included. Write for Bulletin No. 4 or use reply coupon.

1151—Circuit Breaker System. A concise and well-illustrated 28-page catalog, No. C. B. 1000, on the new Stab-Lok Circuit Breaker System has been announced by Federal Electric Products Co., 50 Paris St., Newark 5, N. J. Advantages of the system comprise headings under which are listed complete specifications. Dimensions and knockout locations, purchasing information, and wiring diagrams are features of the catalog.

1153—Jiffy Line Electricians' Tools and Wiring Specialties. A new catalog issued by Clyde W. Lint Co., 2323 West 18th St., Chicago 8, Ill., discusses details of the company's line of tools and electrical wiring devices, pole line hardware, and standard porcelain.

1155—Wire and Cable. Two catalogs—Bulletin RS-5, and Power and Control Cables, No. 24—available from Rome Cable Corp., Rome, N. Y. Power and Control Cables catalog is intended for utility, construction, and industrial engineering and purchasing personnel as a guide in selection of proper wire and cable types.

1157—Transformers. Dongan Electric Manufacturing Co., 2998 Franklin, Detroit 7, Mich., has brochures available on its various types of transformers, including power circuit, control, signaling, machine tool, ignition and neon transformers.

1163—Connections With Aluminum Conductor. A 20-page booklet illustrating practical and proved methods of making good connections with aluminum conductor, especially in distribution lines and service drops. Cartoon style is used to simplify and emphasize five rules for making proper connections, including aluminum-to-copper. All data are based on approved technical principles. Designed especially as an educational and training aid, the manual is available in any quantity desired free of charge from Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

1165—Ceiling Heating. "Sunwarm Electric Radiant Heating Cables." Complete information on ceiling radiant heating with Sunwarm radiant heating cables, including approved installation methods, available by writing Sunwarm, Inc., Box 263, Kingsport, Tennessee.

1167—Industrial Lighting Equipment. A four-page catalog insert is now available from the Multi Electric Mfg. Co., Inc., 4223-43 West Lake St., Chicago 24, Ill. The leaflet describes Multi's line of lighting equipment and wiring devices, which include floodlights, vaporproof fixtures, and fluorescent and incandescent fixtures.

1169—Lighting Fixtures. Fluorescent and slimline luminaires, for schools, offices, stores, etc. Illustrated in the new catalog issued by Sta-Brite Fluorescent Mfg. Co., P. O. Box 6352, Miami, Fla., may be obtained upon request.

1171—Exhaust Fans. A four page catalog sheet, completely illustrating three 20" window fans, one 16" window fan. A 16" and 20" Roll-a-bout fans—16" and 20"circulators now available from National Engr. & Mfg. Co., 16th & Lamine St., Sedalia, Mo.

1173—Ventilating Equipment. Acme Equipment Co., of Muskogee, Okla., is currently offering a loose leaf catalog giving information on its line of attic fans, ceiling and wall shutters, industrial fans, and air conditioning units. The information includes photographs and diagrams, specifications, descriptions, and dimensions.

1175—Fluorescent and Slimline Fixtures. The Light and Power Utilities Corp., 1035 Firestone Blvd., Memphis, Tenn., has recently issued a new catalog describing its line of fluorescent and slimline lighting fixtures. Typical installations of the fixtures are shown and discussed, as well as prices, specifications, and illustrations of all the items in the line.

1177—Wall and Portable Furnaces. A new eight-page folder has been issued by Meier Electric and Machine Co., Inc., 3525 East Washington St., Indianapolis, Ind., giving descriptive information on the company's line of small electrical heating units. The booklet explains how the equipment may be used as primary or auxiliary heat.

1179—A.C. Magnetic Motor Starter. An 8-page bulletin, issued by the Clark Controller Company, 1146 East 152nd Street, Cleveland 10, Ohio, describing their Type "CY" A.C. magnetic motor starters, which feature a unique and extremely efficient method of extinguishing the arc.

1181—Wiring Devices. Rodale Manufacturing Co., Inc., Emmaus, Pa., announces publication of its latest catalog pictorially displaying its full line of more than 600 electrical wiring devices and Turn-Tyte interlocking connectors. The book contains 44 pages, fully illustrated, and is available upon request.

1183—Electrical Equipment. The Wadsworth Electric Mfg. Co., Inc., Covington, Kentucky, has issued a new catalog Con 15-0 and Bulletin W. C. B. 53-1, containing data on their lines of Safety Switches, Service Equipment Distribution Panels and "E-Z-RED" Circuit Breakers.

1185—Outdoor Floodlights. A complete 24-page catalog commemorating Lights Diamond Jubilee has been published by Magni Flood, Inc., Mt. Vernon, N. Y. This catalog and price sheet shows pictures of all Par & R fixtures, wiring devices and island mushroom lights which they manufacture. In addition, a complete section of this two color catalog is devoted to the technical data pertaining to sealed beam type lamps.

1187—Fans and Blowers. Complete information on Peerless Electric Company's fans and blowers is available in illustrated Catalog SDA-160. Detail drawings, product specifications and rated capacities are included. The Peerless Electric Company, West Market Street, Warren, Ohio.

1189—Room Air Conditioners. Complete Line Folder—CL-54—covering Remington's "Tropic-Tested" line of both Window and Console Model Air Conditioners. This, termed the industry's most complete line, originally built for export, has been proved in use in over 62 foreign countries and is now available domestically. Several exclusive features have been produced by Remington Air Conditioning Division, Auburn, New York.

1191—Control Centers. Colorful 24-page booklet by The Clark Controller Company, 1146 East 152nd Street, Cleveland 10, Ohio, describes advantages of Centralized electrical control systems through use of A.C. Motor Control Centers. Typical installations, specifications and planning pits are featured.

1193—Fans and Cooling Equipment. Signal Electric Manufacturing Co., Menominee, Mich., has recently issued its 1954 catalog which features the company's complete line of window, pedestal, desk, and oscillator fans. The new color book gives descriptions, features and specifications for each of the company's products.

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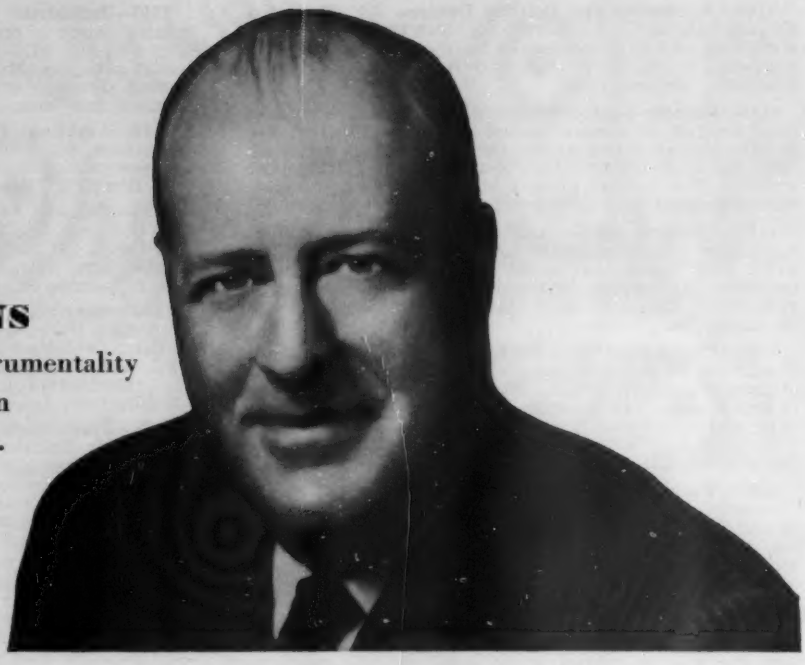
constitute our greatest instrumentality for adult business education and exchange of know-how. They are veritable textbooks for the sciences, businesses, industries and professions that they serve."



Lee H. Bristol, President, Bristol-Myers Company

Staying ahead of important developments is a must for all executives in business, in industry, in professions. As Mr. Bristol says, business publications are veritable textbooks. But, more than that, they are current revisions of the texts of essential businesses, industries and professions. Forecast shadows of the coming events on the business horizon are shown to American leaders in each issue of business publications. Specialized periodicals, often sharply focussed, cover many specific fields. No man in leadership, or in training for leadership, can afford to miss the regular reading of his business publications. That's why advertising pages of the Business Press make such a *direct route for anyone who has anything to sell to the buying factors in business, industry or the professions.*

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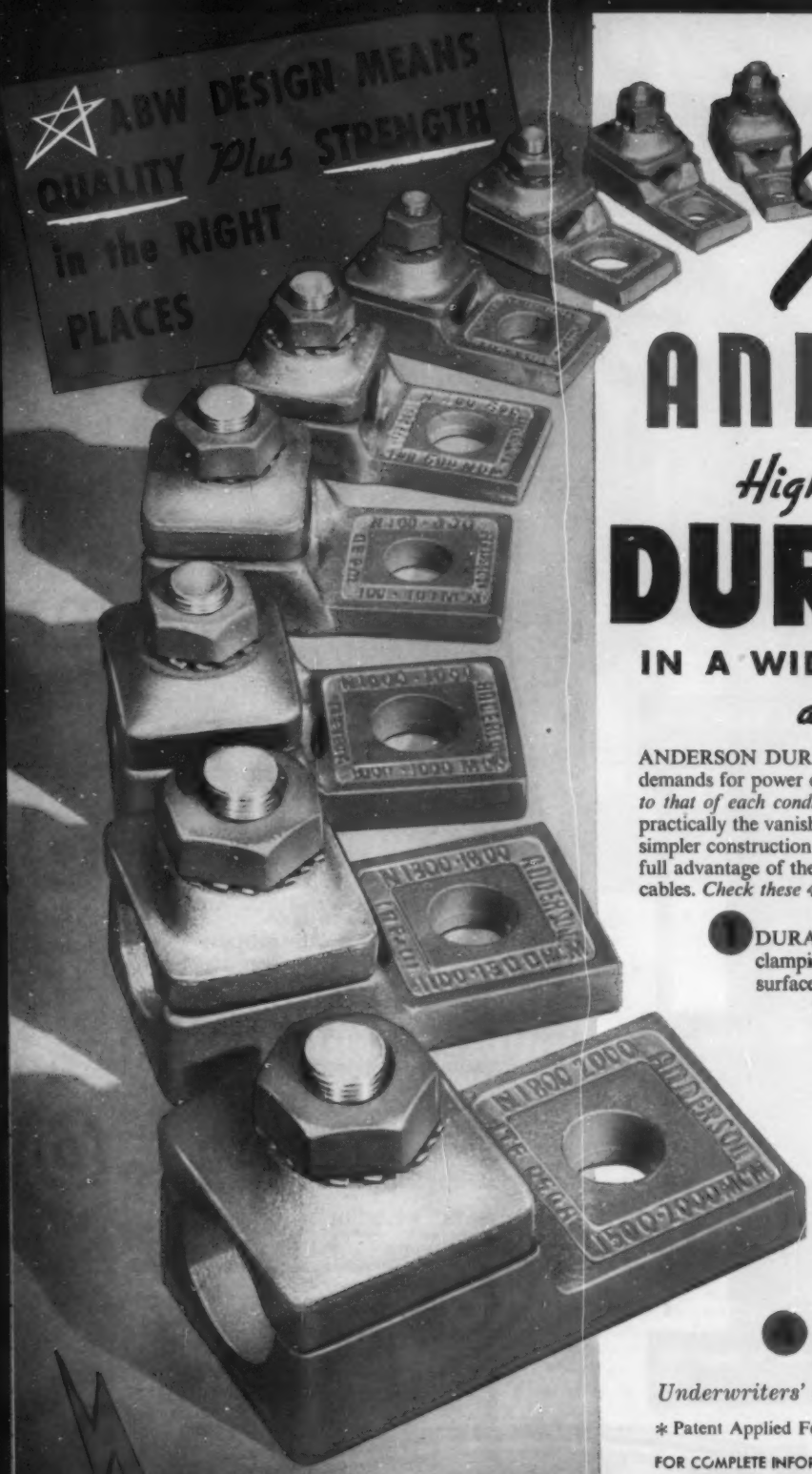

Now... ANDERSON

High Tensile Bronze

DURA LUGS*

IN A WIDER RANGE OF SIZES *and capacities*

ANDERSON DURA LUGS* are specifically designed to meet the demands for power connectors with current-carrying capacities *equal to that of each conductor used.* Joint resistance has been reduced to practically the vanishing point . . . and, their sturdier, more compact, simpler construction all combine to assure positive pressure and take full advantage of the current-carrying capacity of every strand in the cables. *Check these 4 points of superiority:*

1. DURA LUG* design combines high tensile bronze for clamping members and high conductivity metal contact surfaces for greater current carrying characteristics.

   This means:

   - **A** Minimum elongation in the cable opening to maintain clamping pressure.
   - **B** Withstands A.S.T.M. Mercurous Nitrate Test.
   - **C** Develops maximum "pull out."

2. They require no special tools to install.
3. Lockwasher provided to prevent loosening under vibration.
4. 11 sizes provide the *right* capacity for each size of cable used.

Underwriters' approval on all catalog sizes to I T E 050A

* Patent Applied For

FOR COMPLETE INFORMATION, CONSULT ONE OF OUR NEAREST 20 REPRESENTATIVES . . . OR CONTACT OUR MAIN OFFICE.

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In this big, modern factory at Pawtucket, Rhode Island...

High-speed drawing machines draw pure copper rods into wire . . .

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Selected insulating materials are blended in huge intensive mixers.

All these, and many more essential wire-making operations are under one roof . . . one responsibility . . . at Carol's complete cable plant.

The result: a precision-made line of high quality wire and cable for electrical, electronic and industrial applications. For complete facts, write or call Carol Cable today.

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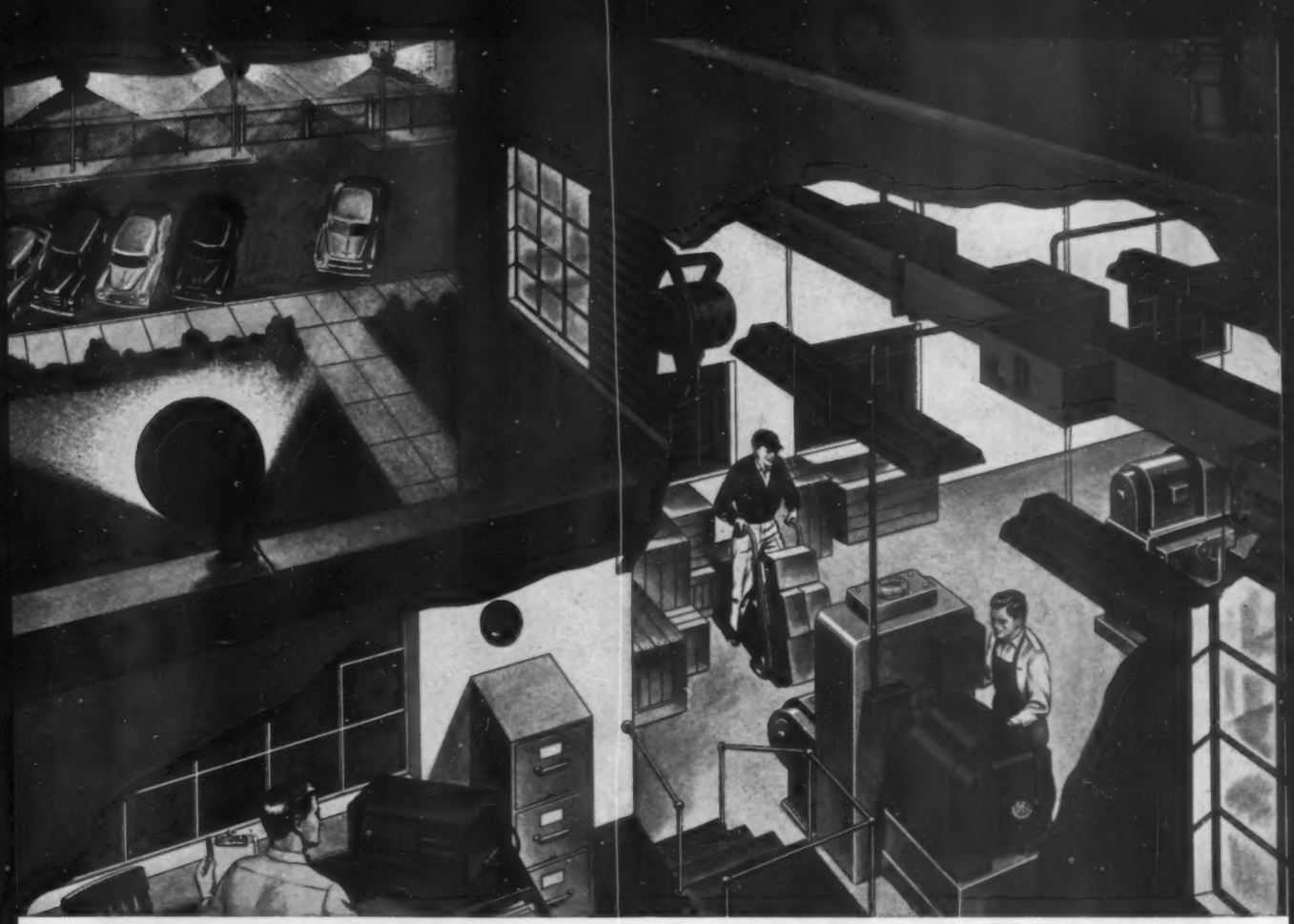
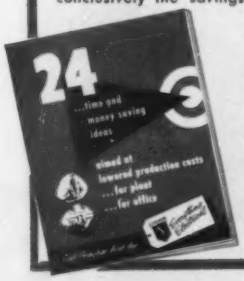


MORE THAN 100,000 ELECTRICAL ITEMS are promptly available from nearby Graybar — complete wiring systems for any industrial need . . . apparatus for power distribution . . . indoor and outdoor lighting units and lamps . . . ventilating, signaling, and "intercom" equipment . . . plus cable, conduit, wiring devices, and tools needed to install them.

If it's electrical, you can get it from Graybar

SEND FOR YOUR FREE COPY, TODAY

This fact-filled booklet "24 Time- and Money-saving Ideas" gives actual case-history proof of the statements made at right . . . demonstrates conclusively the savings possible through improved utilization of electrical equipment of all kinds. Write to the address below for your copy.



For more information relative to any electrical installation, however, call your nearby Graybar Representative — he'll be happy to serve you.

And, because you want efficient service, here are four more reasons why your next order for electrical equipment and supplies should read "via Graybar."

1. Graybar distributes the products of over 600 of the nation's leading manufacturers — well known lines of proved design and construction.

2. You can get complete price and specification data on all these items through your local Graybar office or warehouse.

3. Local stocks of standard electrical items and fast delivery on non-stock lines assure on-schedule deliveries for both construction and every-day maintenance jobs . . . in emergencies, shut-down time can be held to a minimum.

4. Graybar Specialists in all of the major electrical fields are always available for consultation on out-of-the-ordinary projects. You can rely on them for careful analysis of your customer's requirements and complete impartiality in product recommendations.

Make it a point always to call Graybar *first* — a single source . . . a single responsibility will save you time and money.

Graybar Electric Co., Inc. Executive Offices: Graybar Building, 420 Lexington Ave., New York 17, N. Y. 412-73

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IN OVER 110 PRINCIPAL CITIES

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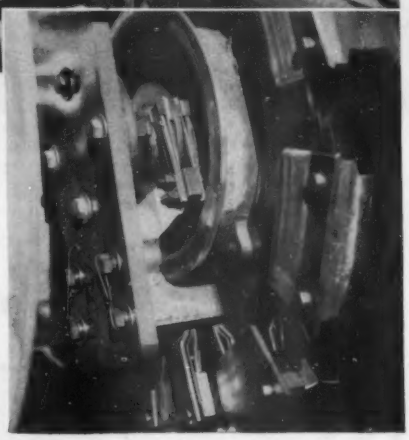
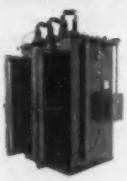


Practically No Wear After 1,240,000 Operations

Pictures above and at right show mechanism and contacts of an Allis-Chalmers power regulator that operated on a west coast utility for 17 years. You can see from these unretouched photos that nearly a million and a quarter operations resulted in practically no wear. This regulator is still in condition to provide many more years of satisfactory service.

You get operating records like this only from Allis-Chalmers. Twenty years of experience designing and building 5/8% step voltage regulators results in rugged construction and proved reliability. Laboratory tests, for example, show that the *Quick-Break* mechanism can withstand five million operations. The 17-year result shown above adds field proof to these laboratory tests.

Next time you consider regulation, for new or replacement installations, it will pay you to check the advantages of Allis-Chalmers regulators. For complete details on their design and construction see the A-C office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4243



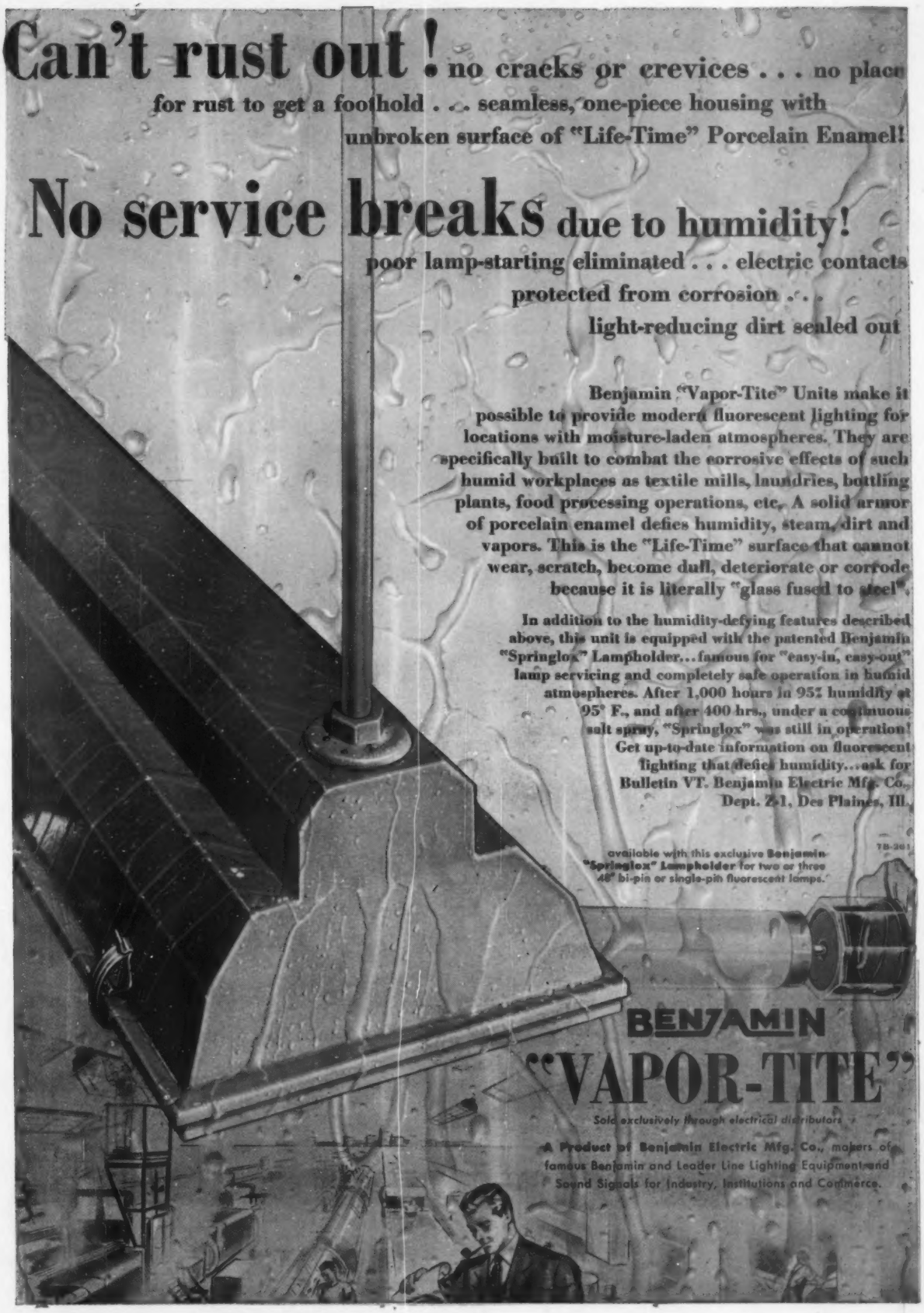
Three-Phase Power Regulator

Single-Phase Distribution Regulator

Single-Phase Power Regulator

ALLIS-CHALMERS

Originators of 5/8% Step Regulation


Can't rust out! no cracks or crevices . . . no place for rust to get a foothold . . . seamless, one-piece housing with unbroken surface of "Life-Time" Porcelain Enamel!
No service breaks due to humidity!
poor lamp-starting eliminated . . . electric contacts protected from corrosion . . . light-reducing dirt sealed out
Benjamin "Vapor-Tite" Units make it possible to provide modern fluorescent lighting for locations with moisture-laden atmospheres. They are specifically built to combat the corrosive effects of such humid workplaces as textile mills, laundries, bottling plants, food processing operations, etc. A solid armor of porcelain enamel defies humidity, steam, dirt and vapors. This is the "Life-Time" surface that cannot wear, scratch, become dull, deteriorate or corrode because it is literally "glass fused to steel".
In addition to the humidity-defying features described above, this unit is equipped with the patented Benjamin "Springlox" Lampholder... famous for "easy-in, easy-out" lamp servicing and completely safe operation in humid atmospheres. After 1,000 hours in 95% humidity at 95° F., and after 400 hrs., under a continuous salt spray, "Springlox" was still in operation!
Get up-to-date information on fluorescent lighting that defies humidity... ask for Bulletin VT. Benjamin Electric Mfg. Co., Dept. Z-1, Des Plaines, Ill.
available with this exclusive Benjamin "Springlox" Lampholder for two or three 48" bi-pin or single-pin fluorescent lamps.
BENJAMIN
"VAPOR-TITE"
Sold exclusively through electrical distributors
A Product of Benjamin Electric Mfg. Co., makers of famous Benjamin and Leader Line Lighting Equipment and Sound Signals for Industry, Institutions and Commerce.

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NO BETTER
TRANSMISSION CONDUCTOR
AND NO
SERVICE TO EQUAL
THAT OF . . .

Southern Electrical Corporation

CHATTANOOGA, TENNESSEE

Write, wire or phone us when you need:

ACSR Conductors

ACSR Accessories

Bare Copper Wires and Cables

Galvanized Steel Strand

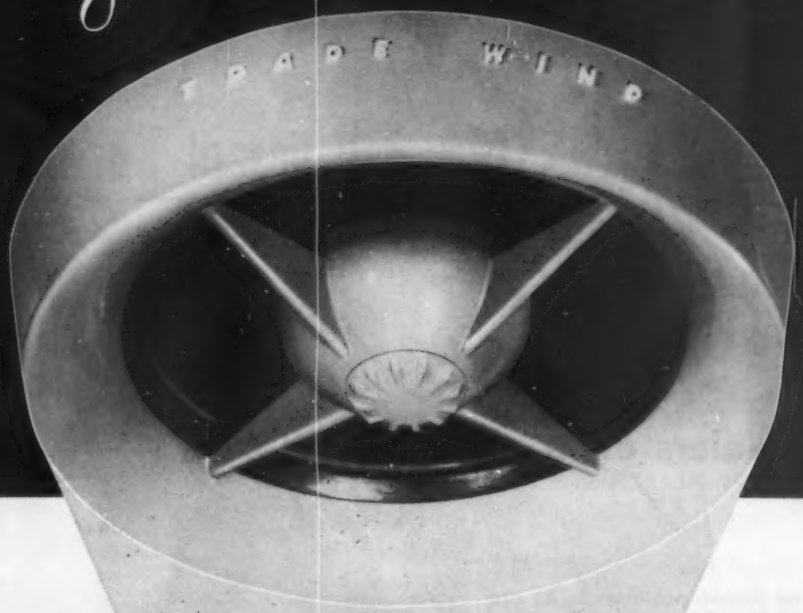
Weatherproof Wire (Aluminum or Copper—Neoprene or Type URC—Neoprene Triplex)

Our own trucks make delivery to points in the southeastern area within 48 hours after we receive an order. When you place your order, we will tell you when to expect it—and you can depend on what we say.

We appreciate your business

Sensational, New Axial Flow Ventilator

By TRADE-WIND



TREMENDOUS SUCTION . . . UNUSUALLY QUIET . . . PRIZE DESIGN!

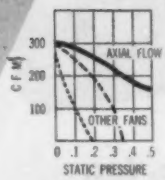
Terrific performance at half the power—unmatched beauty—and tagged with a low L-O-W price is this new AXIAL FLOW ventilator which Trade-Wind has developed under wraps over the past three years.

This revolutionary ALL NEW design now for the first time brings all the great advantages of straight-through axial air flow to the home ventilator field—and at a price that makes kitchen ventilation a BIG feature even for the lowest priced house.

In styling the AXIAL FLOW is as outstanding as its performance. Completely original with its deep intake scroll, it's a prize beauty created by one of America's top industrial designers.

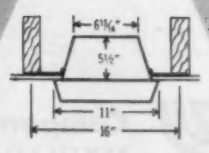
There's nothing that comes close to matching this all-new axial flow development by Trade-Wind. See it, test it, compare it and you'll understand why the Trade-Wind AXIAL FLOW will sweep the light construction market.

REVOLUTIONARY PERFORMANCE of the AXIAL FLOW is indicated in this chart. Note the ability to overcome duct resistance — characteristic of *all* Trade-Wind ventilators.



Write or Wire for Complete Information

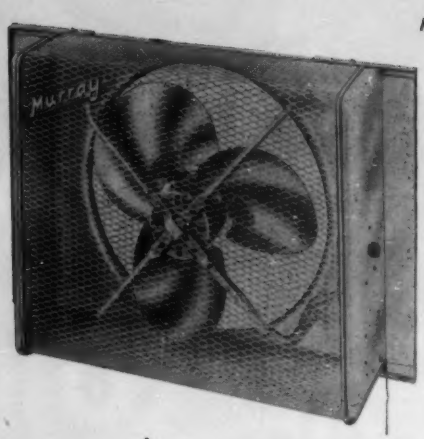
STYLED BY HUNT LEWIS. The outstanding originality of the Trade-Wind AXIAL FLOW styling was created by Hunt Lewis, nationally famous industrial designer.



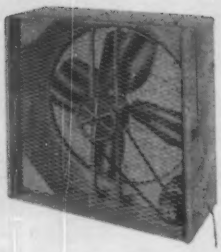
THE NEW Trade-Wind has been designed for the easiest installation. The mounting bars are quickly nailed between joists, the conduit box is fully exposed and the duct work takes any 7" round pipe.

ORIGINATED BY TRADE-WIND MOTORFANS, INC., 5725G S. MAIN ST., LOS ANGELES 27, CALIF.

Murray 20" Window Fan
Reversible or Exhaust—
Only, 1 or 2 speed

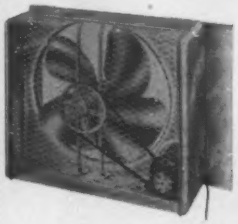


Murray 30" Window Fan
Reversible or Exhaust—
Only, 1 or 2 speed



Murray fans

offer dealers even more in 1954



Murray 24" Window Fan
Reversible or Exhaust—
Only, 1 or 2 speed

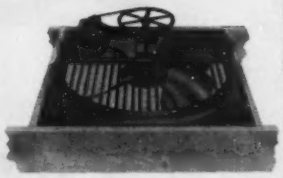
The '54 fan season promises to be the biggest in ventilating history. More people are "ventilating-conscious", "ventilating-anxious" than ever before.

The '54 Murray line is even more complete, offering a type of attic or window fan to fit every home, every pocketbook.

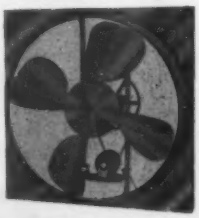
Murray's '54 advertising campaign is geared to make even more of your "ventilating-conscious", customers "Murray-anxious".

The '54 Murray line offers dealers even greater sales volume, even higher profits, even more satisfaction than ever before.

For full information on dealer and distributor franchises and free catalog, write . . .



Murray Attic Fan
Vertical Discharge



Murray Attic and
Industrial Fans
Horizontal Discharge

Murray 16" Window Fan
Portable room-to-room

Exclusive National Sales Agents for Murray Fans
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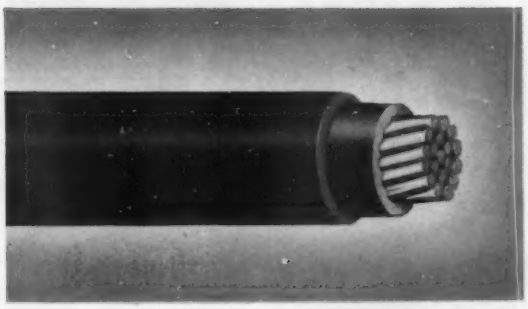
VENTILATING FAN DIVISION • ATLANTA, GA.

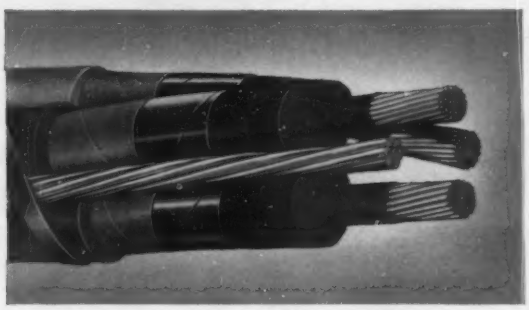
10 reasons why

you should specify, buy,

install U. S. GRIZZLY® POWER CABLES



U. S. Grizzly Power Cable, 600 volts – Type RR single conductor, Hydrosec® – S heat- and moisture-resistant insulation, Neoprene jacket.



U. S. Grizzly Power Cable, 15,000 volts – Type RR – 3-conductor, Uskorona® – ozone-resistant insulation – shielded – Neoprene jacket.

1. Lighter in weight than lead-sheathed cables and lead-sheathed armored cables.
2. Greater flexibility
3. Easier to handle during installation
4. Easier to splice, tap and terminate
5. More resistant to chemical corrosion
6. Unaffected by stray currents
7. Better protection against weathering
8. Longer life
9. Cost less
10. Made by United States Rubber Company, the *only* electrical wire and cable producer to grow its own natural rubber, make its own synthetic rubber and manufacture its own plastics

U. S. Grizzly Power Cables are used for general power distribution, and can be installed in conduits, underground ducts, buried directly in the ground, or installed aerially. Neoprene jacket protects against acids, alkalies, oils, and mechanical damage and weathering. (All IPCEA and NEMA specifications complied with.)

Write to address below for free copy of illustrated reference manual on U. S. Electrical Wires and Cables for the electric utility industry. It lists the type of cable best suited for specific requirements.

US RUBBER

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE AND CABLE DEPARTMENT, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

B-M Fittings

THE ORIGINAL INDENTER TYPE E.M.T. COUPLINGS AND CONNECTORS

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job.

All B-M Indenter Fittings are U. L. approved as Concrete-tight and for General Use. (File Card E 10863)

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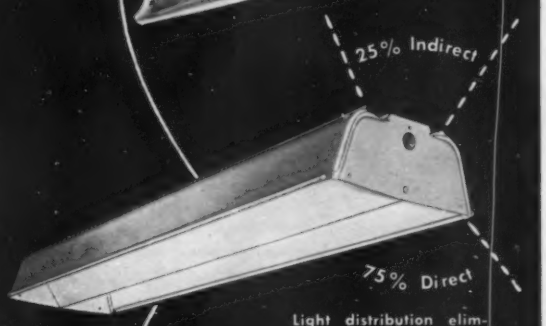
Warehouse Stocks in Principal Cities for Immediate Delivery!

the new CURTIS industrial

Side Reflectors hinge downward and may be completely removed for ease of maintenance.



Light distribution eliminates severe brightness contrast and tunnel lighting conditions.

Louvers available where greater lengthwise shielding is desired.

6000 Series

The New Curtis "Six Thousand" series is designed for Eye-Comfort® in industrial locations. The Luminaires illuminate the ceiling with an indirect component of 25% of the light output. Crosswise shielding of 35° is provided for the 75% direct component. The lighting units in this versatile line are available with Alzak Aluminum, Porcelain Enamel, or baked white "Fluracite" enameled steel removable side reflectors. Low cost efficient maintenance is provided by having side panels readily removable for cleaning. In addition there are no horizontal diffusing or reflecting surfaces to collect dust. There is a unit in this versatile line to accommodate all 4', 5' and 8' fluorescent lamps. The Curtis "Six-Thousand" series brings Appropriate Brightness Control Lighting to industrial areas. Mail coupon for FREE descriptive literature.

Curtis "Tong Hangers*" facilitate and cut installation cost as they allow flexibility in placement of hangers and permit bypassing of building construction obstacles such as beams, sprinkler heads, etc.

*Pat. applied for.

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Dept. C15-20, 6135 West 65th Street
Chicago 38, Illinois

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Company_____

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DUNCAN TYPE MH Polyphase Meters

A Polyphase Meter for Every Type of Service

- ✓ ACCURACY ON HIGH OVERLOADS*
- ✓ SIMPLICITY
- ✓ GOOD PERFORMANCE

. . . as required for modern Polyphase Metering

*All meters to 400% of nameplate rating, except 50 ampere bottom connected meters which go to 300%, or 150 amperes, due to the limitation of terminal block dimensions. The 50 ampere socket type meters may be used to meter continuous loads to 200 amperes in Duncan Type HD Mounting Device.

TYPE MH METERS	SERVICE
(Recommended types for self-contained applications.) TYPE MH-2A, TYPE MH-2S	3-phase, 3-wire
(These meters are equipped with necessary extra terminals for 3-wire reactive or transformer applications) TYPE MH-2P, TYPE MH-2SP	3-wire from 4-wire wye
TYPE MH-2P△, TYPE MH-2S△	3-phase, 4-wire delta
TYPE MH-2½P, TYPE MH-2½S	3-phase, 4-wire wye

Write for New Bulletin 179

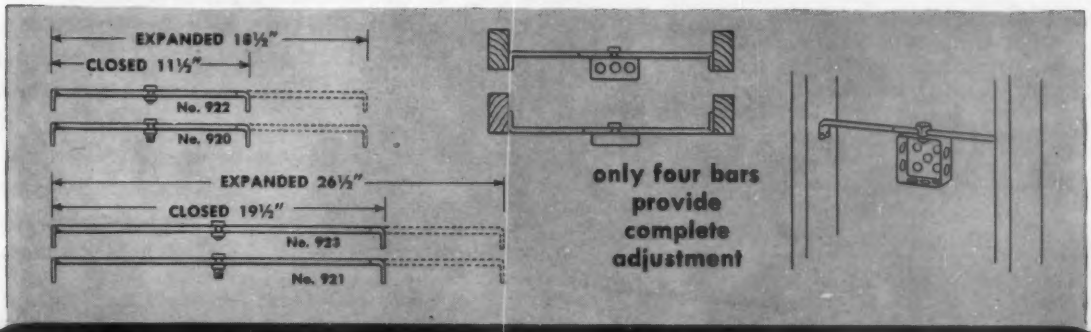
DUNCAN

DUNCAN ELECTRIC MFG. CO.
LAFAYETTE INDIANA

RACO OFFERS

ONLY 4 BARS ENABLE YOU TO INSTALL ANY DEPTH BOX WHEREVER YOU WANT IT REGARDLESS OF STUDDING SIZE OR SPACING

STOCK JUST 4 BARS INSTEAD OF 16



NORMAL SAFETY PRECAUTIONS REQUIRE THAT A BAR MUST WITHSTAND THESE TESTS

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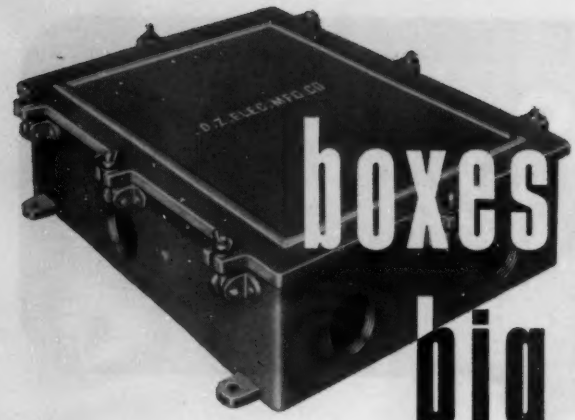
ALL-STEEL EQUIPMENT INC. · Aurora • Illinois



boxes are big business at O.Z....

So big, in fact, that our junction box manufacturing facilities are located in a new 35,000 square foot plant. Here, in a modern building, are men, equipment and space to fabricate a complete line of surface and flush-mounting junction boxes for every application and requirement. A large stock is maintained at all times for speedy delivery. Your O. Z. distributor is now in a better position than ever to fill your needs.

Modern equipment for fabricating junction boxes in this O. Z. box plant means greater efficiency for us . . . better service for you.

Greatly increased stock assures a constant supply of standard junction boxes and speedy processing of your orders.

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND ST. • BROOKLYN 17, N. Y.

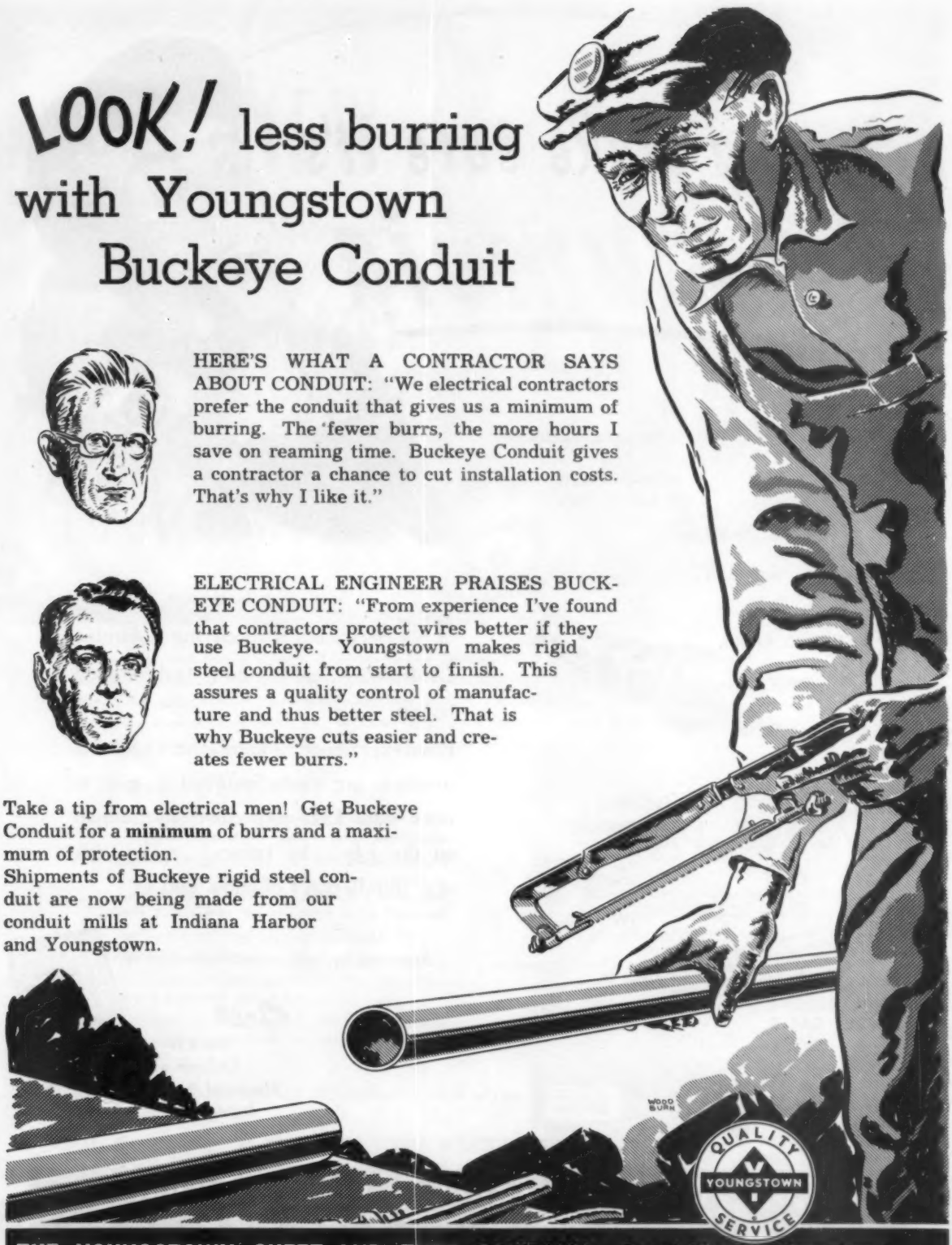
CAST IRON BOXES • SOLDERLESS CONNECTORS
CABLE TERMINATORS • GROUNDING DEVICES
POWER CONNECTORS • CONDUIT FITTINGS

LOOK! less burring with Youngstown Buckeye Conduit

HERE'S WHAT A CONTRACTOR SAYS ABOUT CONDUIT: "We electrical contractors prefer the conduit that gives us a minimum of burring. The fewer burrs, the more hours I save on reaming time. Buckeye Conduit gives a contractor a chance to cut installation costs. That's why I like it."

ELECTRICAL ENGINEER PRAISES BUCKEYE CONDUIT: "From experience I've found that contractors protect wires better if they use Buckeye. Youngstown makes rigid steel conduit from start to finish. This assures a quality control of manufacture and thus better steel. That is why Buckeye cuts easier and creates fewer burrs."

Take a tip from electrical men! Get Buckeye Conduit for a **minimum** of burrs and a maximum of protection.
Shipments of Buckeye rigid steel conduit are now being made from our conduit mills at Indiana Harbor and Youngstown.



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General Offices — Youngstown 1, Ohio

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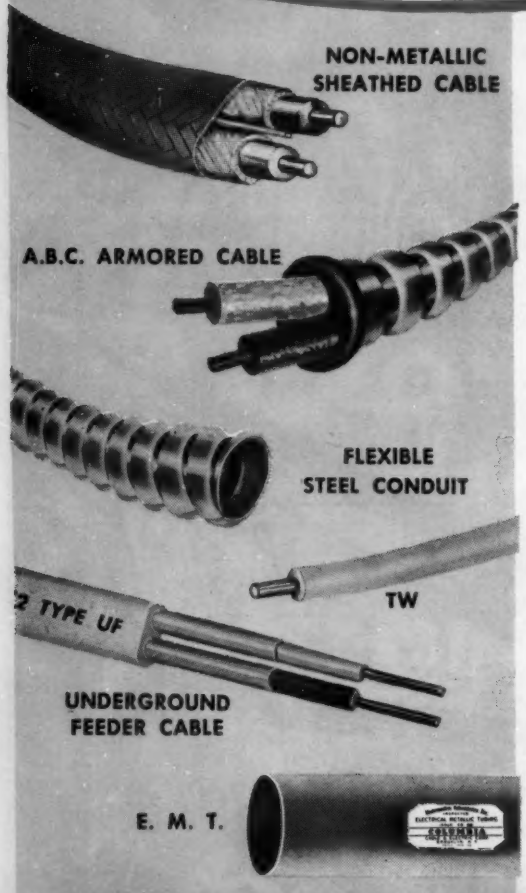
Export Office - 500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES.

and make sure it's Columbia



This electrician is specifying Columbia Cable, Wire, and Conduit. And for good reason.

From experience, he knows that Columbia products are easily installed . . . easy to work with. Take your cue from the man on the job . . . he knows . . . make your next installation Columbia and see!

Approved by Underwriters' Laboratories

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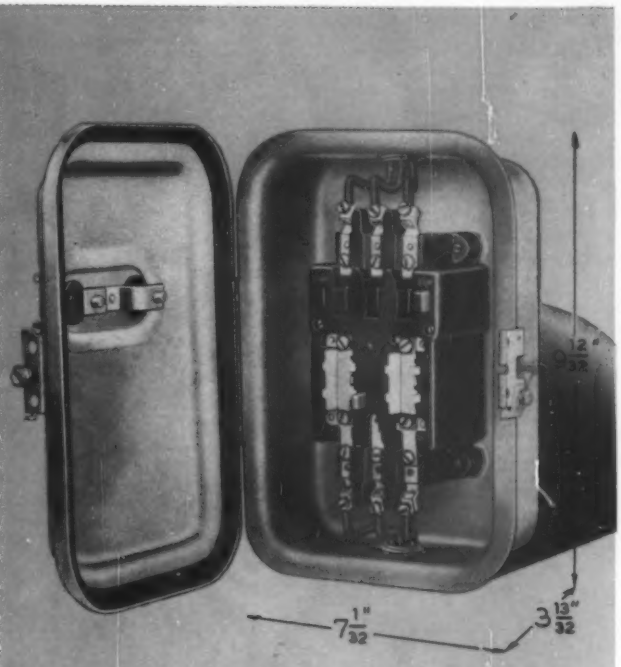
ALL NEW

and designed *specifically* for the

TEXTILE INDUSTRY

THE AH TYPE "LM"

LOOM SWITCH



SIZE 0 — 3 POLE — 2 HP To 600 VOLTS A-C

Here for the first time is a manual, across-the-line Starting Switch designed and built *specifically* for the Textile Industry. Completely new and radically different throughout, the Arrow-Hart Type "LM" employs a distinctive, built-for-the-purpose switch mechanism housed in a specially engineered, lint proof enclosure . . . it is *NOT* just an adaptation of a standard switch with a "face lifting." As a result the Type "LM" assures new standards of performance, dependability and safety on single or multiple spindle looms.

Outstanding Features..

- UNIQUE ROTARY TYPE MECHANISM RESISTS SHOCK . . . far in excess of any found in actual installations.
- LINT PROOF ENCLOSURE . . . with efficient, balloon type neoprene impression gasket. No knockouts or mounting holes to admit lint. Self-locking latches hold cover tightly even though screws aren't tightened.
- MUCH SMALLER SIZE, GREATER COMPACTNESS . . . saving valuable space.
- FULLY ENCLOSED MECHANISM . . . for extra safety, double protection against lint.
- PUSH BUTTON OPERATION . . . the *preferred* control throughout industry. Buttons are lint proof, electrically insulated.
- STRAIGHT-THRU WIRING . . . is faster, easier to install, no need for looping or U-bending.
- SAFER RE-SET MECHANISM . . . with lever *inside* lockable enclosure restricts re-starting to qualified personnel. Mechanical interlock prevents re-setting unless the Switch is "Off."
- SWITCH EASILY REMOVED FROM ENCLOSURE . . . without disturbing wiring. All wiring is brought to terminal blocks; switch is secured to these by 6 screws.
- UNDERWRITERS' APPROVED FOR SINGLE AND GROUP FUSED INSTALLATIONS!

SEND FOR COMPLETE INFORMATION . . . write for your copy of the new A-H Loom Switch Folder.

ON DISPLAY at the AMERICAN TEXTILE MACHINERY EXHIBITION Atlantic City, N.J. — April 26 thru May 1, 1954 Booths Nos. 868-869

INDUSTRIAL CONTROL DIVISION

The ARROW-HART & HEGEMAN ELECTRIC Co.

103 HAWTHORN STREET, HARTFORD 6, CONN.

Please send me my new Loom Switch Folder.

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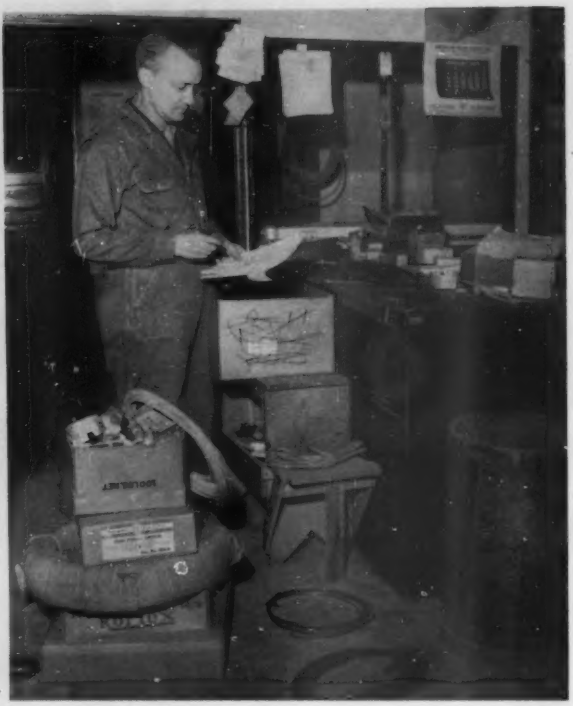
CO. NAME _____

POSITION _____

ADDRESS _____

CITY _____ ZONE ____ STATE ____

A Complete Line of ADVANCED DESIGN Motor Controls for the Textile Industry.



The firm's central location permits suppliers to make prompt deliveries. Another time-saving advantage employed by the company is the stock box idea by which the proper materials for each unit of a job are kept handy to the location. The materials are assembled at company headquarters and sent to the site of the job well in advance of job starting dates.

Profitable handling of

◆ SEVENTY-FIVE PER CENT of the business of the very successful Twin City Electric Company, of Kansas City, Mo., is derived from the residential market with specialization on housing projects. The firm prides itself on the ability to handle any size project with maximum efficiency, giving painstaking attention to methods which will speed up work and promote efficiency.

"Customized" work in luxury-type homes in the $100,000 to $200,000 category is another specialty of the firm as well as some commercial work including small factories and filling stations. A recently-completed job involved an 11-story apartment building. But the 37-man organization is basically geared to attend to the special electrical requirements of builders and contractors in the new home field.

An example of jobs in the housing category undertaken by the Twin City company is the recent contract to make electrical installations in the Ruskin Heights residential development in Kansas City, which will cover 1,750 houses. Electrical work on this particular project runs to $240 per unit.

Typical of the techniques which help speed work and promote efficiency is the stock box system of supplying material to jobs. This system was adopted two years ago in lieu of delivering material to the job daily by truck and picking it up and returning it to the warehouse at the end of each day, which often led to delay on the job, and overtime pay for truck drivers. Some pilferage resulted, too, and there was never any surplus material on the job in case the supply ran short.

With the stock box plan, losses due to pilferage have dropped to almost zero (about four times under the old method), operational expense in overtime compensation to drivers has decreased, deliveries of material have been cut 25 per cent, and there has been noticeable increase in efficiency.

Key device in the plan is a plywood box, designed by the company president, C. L. Rice, and built by a local carpentry shop for $15 per unit. It measures five feet

Stock boxes on the job are fitted with a master lock so that they may remain on the job until the job is completed. Long handles facilitate handling of the plywood structures which are taken to the site by the company's panel trucks. If the electrician on the job needs additional material, it is kept for him in the stock box to eliminate delays.

residential wiring

by Grier Lowry

in length, thirty inches in width and is two feet deep. The boxes have long handles to facilitate handling.

The firm has two steel boxes, built along similar lines, for territory work, each with a master lock which permits it to remain on the job until it is completed. This packaged material unit includes certain basic items—ceiling pans, various sizes of wire, fasteners, service equipment, fuse panels, etc. There are no tools in the box except for a 4-foot ladder which fits neatly into the bottom. The men carry their own tools.

The stock boxes are usually filled with necessary materials and delivered to the job a day in advance of the starting date. The firm is ordinarily three days behind on orders which expedite the task of setting up deliveries.

Four of the stock boxes fit easily into the firm's panel delivery trucks. Material orders are filled from a Material Work Sheet form, with a time card. This form tells the warehouse clerk precisely what items are needed for particular jobs. Truck drivers route deliveries, and it's not unusual for the firm to have fourteen or fifteen boxes moving out to jobs in one day.

The material sheet is an integral component of the stock box. It reflects in one column, quantity of materials supplied to a job. Another column shows the amount of material returned at the end of a job, and still a third column records the quantity of merchandise used. Other columns record description of item, unit cost price and the billing price.

The back of the form represents another vital part of the system. It is the Outlet Work List. After a job is "roughed," the warehouse clerk checks materials shown on the floor plan against the Outlet List. He goes through every room of a house in performing this duty. As soon as the material list is compiled, the warehouse clerk simply turns the form over and makes out the Outlet Work Sheet.

The outlet sheet shows exactly what is supposed to be wired, it reflects any use of extra materials, and since it is gone over carefully before a job is "covered up," it guarantees that the work is done according to specifications.

"If the plan shows there should be a bracket light in front of a house," Mr. Rice pointed out, "and the outlet sheet doesn't show this was done, then the clerk's job is to find out why it wasn't installed by

consulting either the builder or owner."

"The system provides a good record on use of materials," he continued. "Take for example the list which calls for ceiling outlets, which means a metal box for each outlet. If there are ten outlets shown on the list, and the material list reflects only eight, then we know there is a mistake someplace and go to work to find out where."

System is efficient

"The stock box system, integrated with these forms," he explained, "has stepped up efficiency by making certain that the material is always ready when the electrician is. It keeps the men on their toes. It also provides surplus materials for use in cases where needed."

Having surplus material on the job at all times," he went on, "is especially important on custom jobs. Extra switch boxes, ceiling pans, plugs, and so on, are included in the stock box and if the owner takes a sudden notion for an extra plug in a room, then the electrician is able to make the installation immediately without telephoning in for the supplies. This policy promotes better service to made-to-order jobs which we believe has been a key factor in the word-of-mouth advertising our business receives from these customers."

"Repeat business, secured through satisfied customers, represents a substantial portion of our total volume," Mr. Rice stated. "We recently were awarded a contract for a 40-house job because the builder had heard of our reputation for good workmanship and honest dealings."

One reason Twin City Electric is on top of the heap of electrical contractors in the area is due to the fact that the firm goes all-out to avoid the practice of slipping something over on a customer. Emphasis is on doing the job as the contract states.

"There are many different grades of receptacles, switches, and other materials," the company president pointed out, "and we could probably make lower-priced substitutes many times without the builder or owner knowing the difference. But we don't. We give them what they order. We have lost only two customers in the past five years because of dissatisfaction with workmanship or service. It's a record we're tremendously proud of."

The firm always gives the builder what he wants—fast service.

President C. L. Rice has built his Twin City Electric Company on an understanding attitude toward problems of new home builders and contractors.

Keeping the builder's problems constantly in mind is an important part of the program.

"We try to remember," Mr. Rice reminded, "that when the builder of a row of houses is held up by the wiring job, and the lathers, plasterers and other workers are idle, his costs are going up and up. Our plan is to ask for two days' notice from builders and then be on the job. We may have to hold up a repair job, but we'll always give the builders service."

It is standard procedure at the Kansas City firm to have jobs inspected promptly so the utility can turn on the electricity and there is no delay on service when a project is completed.

"A special file is maintained in our office for records of permits and clearances by the light utility," Mr. Rice stated. "One young woman is delegated to keep this file up-to-date and follow through on the details. Every job inside the city limits requires city inspection and building permits. The proper authorities are called in before the job is started for a rough-in inspection, then for a completed inspection.

"If the builder desires to use electricity before the job is finished, we call the light company and ask for a temporary permit. This is a service to the builder that we wouldn't have to provide, but we do it because we feel they appreciate it."

Key personnel of the concern are members of the local Home Builders' Association, the South Kansas City Business Club, the National Electric Contractors Association and the Electrical Association of Kansas City. Carrying advertising in the rosters of these organizations is one of the company's policies.

Staff kept informed

Members of the organization are kept alive, alert and on their toes by monthly get-togethers in Mr. Rice's office. These meetings are primarily held to iron out kinks between management and personnel and keep members informed of new firm policies.

President Rice frequently opens these sessions by smilingly asking, "What are your beefs?" Many ideas later put into practice were suggested by personnel attending these sessions. The idea of providing surplus materials to men on the job was one of the things that came out of these monthly meetings.

Most of the thirty-five workers in the organization are specialists. Some of the men do "house work," others are "commercial men."

"The house specialists," says Mr. Rice, "must have a personal knowledge of national codes, city codes, and be completely informed on requirements of the FHA."

"From the standpoint of giving

(*Continued on page* 88)

Utility service fosters adequate wiring

by C. E. Wright

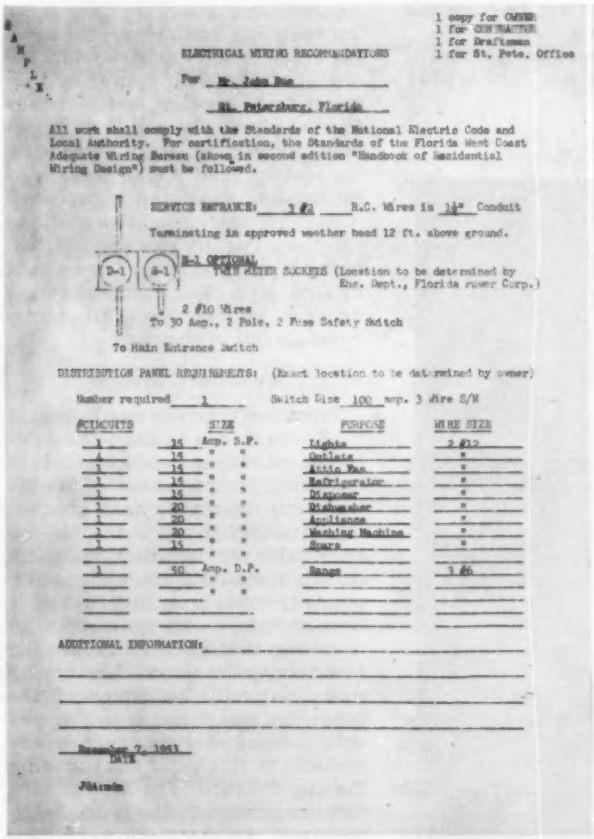
◆ SPECIFICATION SHEETS for electrical wiring shown on this page, illustrate the kind of service the Florida Power Corp., St. Petersburg, Fla., supplies to electrical contractors, builders, architects and home owners. It is estimated that fully 75 per cent of the homes built in the St. Petersburg area since the establishment of the Florida West Coast Adequate Wiring Bureau have installed all-electric kitchens. During its existence the bureau has certified about 1,400 homes as adequately wired.

The Florida West Coast Adequate Wiring Bureau, sponsored by the Florida Power Corp., and licensed by the National Adequate Wiring Bureau, is a non-profit organization supported jointly by electrical contractors, electrical dealers, electrical wholesalers and the electric utility company.

Services which the Florida Power Corporation renders in conjunction with the wiring bureau include the preparation of plans, specifications and cost estimates without charge for architects, builders, electrical contractors and home owners. This work is done by the company's Residential Development Department, which has three draftsmen who devote all of their time to planning and about a dozen residential salesmen who co-operate with the electrical trade in selling "the electrical living idea and the necessity of adequate wiring to make electrical living possible," to quote C. W. Ailstock, manager of this department.

But these services are only a part of the program carried out by the power company in its own

(*Continued on page* 88)



1 copy for OWNER
1 for CONTRACTOR
1 for Draftsman
1 for St. Pete. Office

ELECTRICAL WIRING RECOMMENDATIONS

For Mr. John Doe

St. Petersburg, Florida

All work shall comply with the Standards of the National Electric Code and Local Authority. For certification, the Standards of the Florida West Coast Adequate Wiring Bureau (shown in second edition "Handbook of Residential Wiring Design") must be followed.

SERVICE ENTRANCE: 3 #2 R.C. Wires in 1½" Conduit

Terminating in approved weather head 12 ft. above ground.

D-1 OPTIONAL
A-1 TOWN METER SOCKETS (Location to be determined by Engr. Dept., Florida Power Corp.)

2 #10 Wires
To 30 Amp., 2 Pole, 2 Fuse Safety Switch

To Main Entrance Switch

DISTRIBUTION PANEL REQUIREMENTS: (Exact location to be determined by owner)

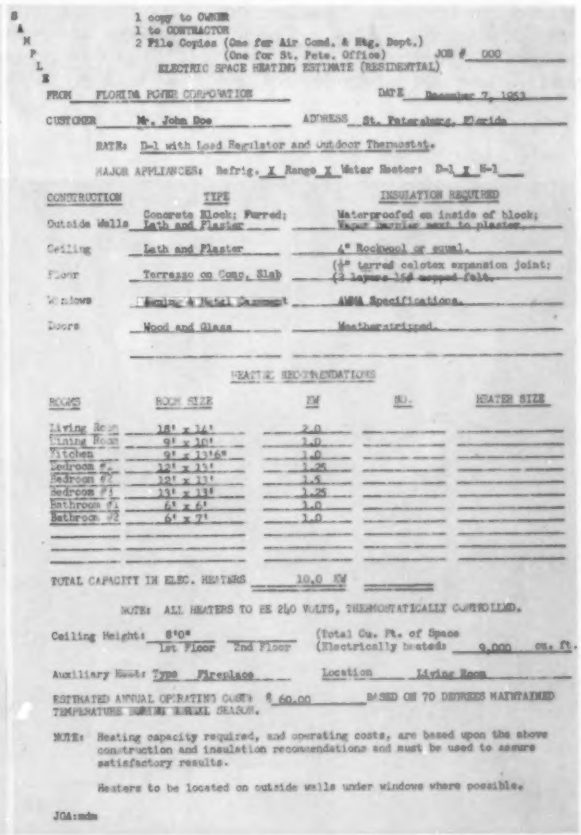
Number required 1 Switch Size 100 amp. 3 Wire S/N

#CIRCUITS	SIZE	PURPOSE	WIRE SIZE
1	15 Amp. S.P.	Lights	2 #12
4	15 " "	Outlets	"
1	15 " "	Attic Fan	"
1	15 " "	Refrigerator	"
1	15 " "	Disposer	"
1	20 " "	Dishwasher	"
1	20 " "	Appliance	"
1	20 " "	Washing Machine	"
1	15 " "	Spare	"
1	50 Amp. D.P.	Range	3 #6

ADDITIONAL INFORMATION:

December 7, 1953
DATE

JGA:mdm



1 copy to OWNER
1 to CONTRACTOR
2 File Copies (One for Air Cond. & Htg. Dept.)
(One for St. Pete. Office) JOB # 000

ELECTRIC SPACE HEATING ESTIMATE (RESIDENTIAL)

FROM FLORIDA POWER CORPORATION DATE December 7, 1953

CUSTOMER Mr. John Doe ADDRESS St. Petersburg, Florida

RATE: D-1 with Load Regulator and Outdoor Thermostat.

MAJOR APPLIANCES: Refrig. X Range X Water Heater: D-1 X S-1

CONSTRUCTION	TYPE	INSULATION REQUIRED
Outside Walls	Concrete Block; Furred; Lath and Plaster	Waterproofed on inside of block; Vapor barrier next to plaster.
Ceiling	Lath and Plaster	4" Rockwool or equal.
Floor	Terrazzo on Conc. Slab	(½" tarred celotex expansion joint; (3 layers 15# mopped felt.
Windows	Awning & Metal Casement	AWMA Specifications.
Doors	Wood and Glass	Weatherstripped.

HEATER RECOMMENDATIONS

ROOMS	ROOM SIZE	KW	NO.	HEATER SIZE
Living Room	18' x 14'	2.0		
Dining Room	9' x 10'	1.0		
Kitchen	9' x 13'6"	1.0		
Bedroom #2	12' x 13'	1.25		
Bedroom #3	12' x 13'	1.5		
Bedroom #1	13' x 13'	1.25		
Bathroom #1	6' x 6'	1.0		
Bathroom #2	6' x 7'	1.0		
TOTAL CAPACITY IN ELEC. HEATERS		10.0 KW		

NOTE: ALL HEATERS TO BE 240 VOLTS, THERMOSTATICALLY CONTROLLED.

Ceiling Height: 8'0" 1st Floor 2nd Floor (Total Cu. Ft. of Space (Electrically heated: 9,000 cu. ft.

Auxiliary Heat: Type Fireplace Location Living Room

ESTIMATED ANNUAL OPERATING COST: $ 60.00 BASED ON 70 DEGREES MAINTAINED TEMPERATURE DURING HEATING SEASON.

NOTE: Heating capacity required, and operating costs, are based upon the above construction and insulation recommendations and must be used to assure satisfactory results.

Heaters to be located on outside walls under windows where possible.

JGA:mdm

These specification sheets are provided to electrical contractors, builders, architects, and home owners by the Florida Power Corporation as its chief contribution to the promotion of adequate wiring.

Industrial application

Electrification of rug cleaning

by Z. A. Biggs

Pres., Biggs and Kirchner, Inc.
Arlington, Va.

◆ IN ORDER to meet the growing needs for its services, E. P. Hinkel and Company, Inc., rug cleaners of Washington, D. C., recently found it necessary to mechanize its rug cleaning processes to increase capacity. Planned to speed up rug cleaning from the time of receipt to the time of delivery by full electrical operation and so absorb a greater volume of business, the new machines comprise the mechanical movement of rugs through beating, washing, rinsing, drying and wrapping processes without manual manipulation.

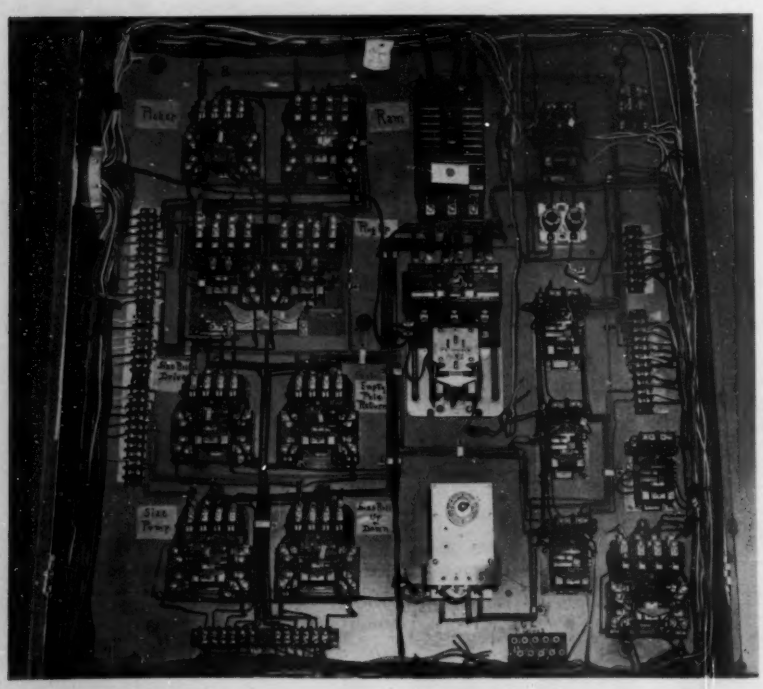
Installation of each machine required relays and transformers specifically designed for it. The job presented mechanical problems and the need for safety devices and control points that had to be worked in through the manipulation of relays. One of only six such installations in the country, the machines have cut down rug cleaning from a two weeks' manual procedure to three days.

A description at this point of the operation of the machines would serve to clarify some of the problems the installation presented. Upon the arrival of a rug, it is delivered to a platform wide enough for the rug to lie flat through the process of beating.

The beating machine consists of a rotating cylinder of leather thongs which pat the sand, dust and dirt loose from a rug. Dust is drawn out through ducts by means of a blower fan to a dust collecting room. Here large bags collect the dirt, on the same principle as a vacuum cleaner. The bags are carried out and emptied manually.

From here the rug is carried on a pinpointed cylinder toward a roller that actuates it through a washing machine 19 feet wide and 30 feet long where streams of soapy water emitted from holes in a horizontal perforated pipe soak the rug. At this washing machine, a set of scrubbing brushes the width of the machine and about six deep moving back and forth crosswise scrub the rugs. After the scrubbing the rug is rinsed with sprays of cold water from another series of perforated pipes. The rug then moves between two rollers that squeeze the water out of it. The process of rinsing and squeezing is repeated.

Another section of the machine can size a rug. By pushing a button sizing is sprayed down from a perforated pipe. The final squeezing between rollers takes all excess moisture out of the rugs.

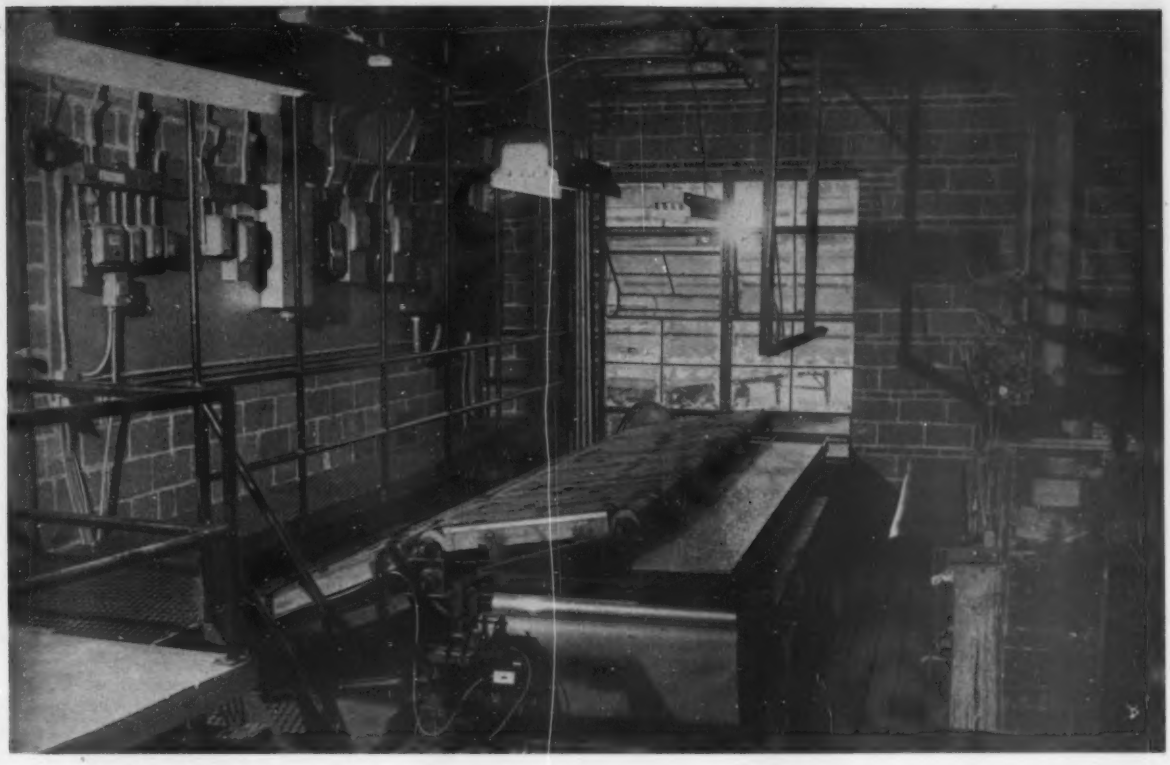


Control panel with switches indicated gives an idea of the complexity of rug cleaning operations recently electrified at the Washington plant.

Automatic process

From the time the rug is beaten to the time it is squeeze-dried between rollers, no hands touch it in any way. No personnel is needed to watch the mechanized processing. However, when it reaches the final table of the first floor, an attendant manipulates it onto a pinpointed conveyer so that the rug is hooked onto a conveyor rod. The clean rug is then carried from the first floor to the second floor drying room vertically by means of the conveyor, and here it is dropped onto a horizontal conveyor where contacts at this point start moving the rug forward. The arrival of a new rug causes the rug being processed to move forward two feet.

The drying process is not completed until the rug has gone the



Control switches, signals, and heat regulation controls may be seen above inspection table in the drying room from where rugs pass to be rolled at the E. P. Hinkel Co. rug cleaning plant in Washington.

length of the 90-foot drying room. At the end of the drying process the rug passes from a horizontal conveyor to a vertical conveyor where it drops to a take-off table. From here it is manipulated to a table from which it passes into a wrapping machine which first rolls up the rug. A length of paper the length of the rolled rug is obtained from a paper machine and placed in the wrapping machine. The rug is then rolled through onto the delivery table and placed in storage.

The heating and drying room have separate controls and the cycle of operation of these machines is so tied in that all processes are allowed a certain time.

When the plant operates at peak production, one rug is put into the machine every two minutes and one rug comes out of the machinery every two minutes. However, complete processing of a rug requires two hours.

Safety features

Certain mechanical and safety problems had to be met. If a rug does not come down right, it strikes wires and an alarm signals notifying the operator to interrupt the operation. If the pole that passes the rug onto the rug-down conveyor becomes twisted or jams, a signal sounds. Control buttons stop the operation to avoid having the sequence thrown off. The individual pole in trouble is brought into proper alignment by pressing a single button which operates the picker motor. Proper operation is started and the sequence is followed through.

Heat for the drying room is adjusted by thermostat from 110 degrees to 195 degrees in accordance with the number of rugs being processed in the room. The heat is furnished by a gas flame which takes a six-inch gas main and a 15-hp fan to furnish the air needed to mix gas and air for the gas burners. A 50-hp fan draws outside air into the heat chamber. Heated to the right temperature, the air then passes through ducts and into the drying room, and is forced out through louvered openings in the ducts. There is enough velocity to have the heated air travel the entire width of the 22-ft. room.

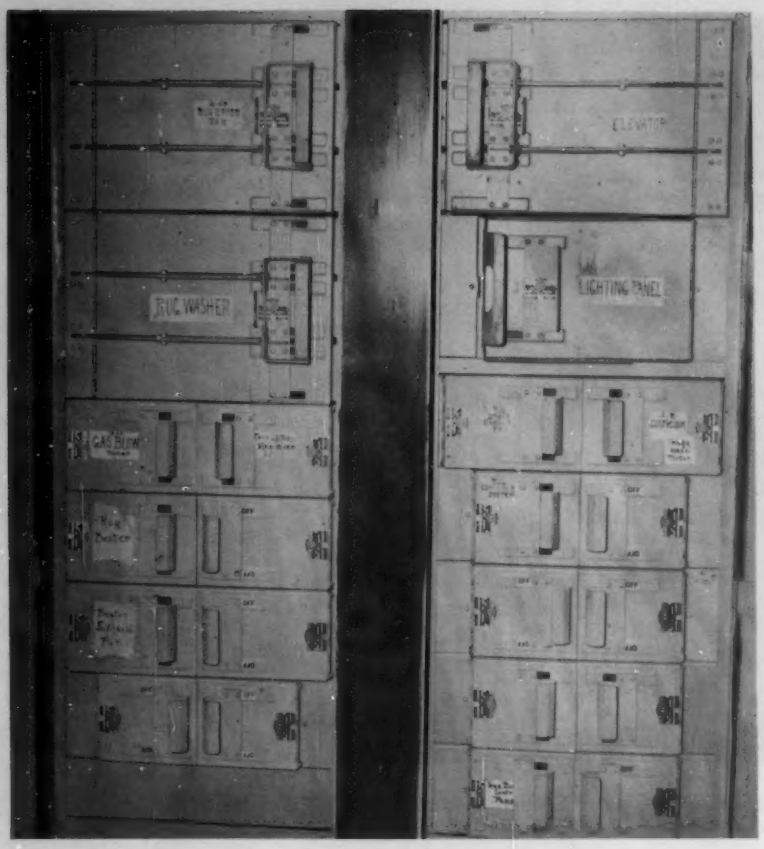
Louvers are placed at various heights so that complete distribution of heated air is obtained over the entire area of the room drying a rug thoroughly in its passage through the room.

A 15-hp fan placed on the roof draws excessive hot air from the room and allows some of this heat to be passed down to the first and second floors for heating purposes.

Starting sequence

In order to control the terrific heat and gas, it is necessary to start the operation of the machines in a certain sequence. A big 50-hp fan is put on first. This has a sail switch, and when the air starts, the sail turns and closes a switch putting a second motor into operation. This starts the exhaust motor on the roof. The sail switch allows the gas blower to be started, and when these operations have been completed it is possible to open the main manually-operated gas valve. With the main gas valve on, the heat may be started by pressing a button controlling the pilot of the gas burner. When the pilot comes on through the electric eye, the electrically operated gas secondary valve is then opened, and the flame in the gas burner is ignited.

If, in the process of bringing the



Another control panel installed by Biggs and Kirshner of Arlington, Virginia, at the E. P. Hinkel and Co. rug cleaning plant. Indications on the panel supplement a wall diagram of the electrical installation to assist the maintenance man in locating trouble throughout the operation.

apparatus into operating condition, there is failure at some point after the start, the entire gas heating system is shut down, and the whole cycle has to be gone through again. This causes a delay of no more than 20 to 30 minutes.

The main service is 1200-ampere, 3-phase, four-wire 120/208 volts. It is reduced to 24 volts through transformers for certain controls. The majority of controls are on 208 volts.

We kept a man on the job for two months after the installation. He trained employees already on the job in the operation of the machinery. Special drawings for ready reference were prepared, simple enough for the maintenance personnel to be able to put their fingers on trouble when it arose.

In the installation all wiring was carried into main junction boxes through numbered connecting strips. Some are tagged with circuit numbers and color coded so that individual wires can be picked out by color or code for maintenance purposes.

We know from information we have received on the few similar installations that we have succeeded in eliminating some of the difficult problems others had encountered. For example, straightening out the jammed pole that was 20 feet in the air could be reached only by ladder to manipulate the pole into the proper angle by crowbar. We solved this problem with our picker motor. On its individual button, the picker motor runs so many revolutions in a cycle. Through it a pole is put back into its proper sequence without interfering with the rugs.

Similarly we removed the problem of very long rugs with our electric eye. Before we introduced this solution, long rug rolls hit the back of the chute and dragged below the take-off table. It was necessary for an attendant to know when a long rug was coming through in

(*Continued on page 87*)

Grid grounding for substations

"IT IS ALMOST ESSENTIAL that some form of grounded network be provided in a substation," a working group of the AIEE Substations Committee reported in digesting the answers to a questionnaire on "Substation Grounding Practices" received from 61 large and small utilities throughout the country. Ninety one per cent of those answering said some type of grid system was employed.

The committee, headed by H. F. Gidlund, Public Service Company of Colorado, in reporting to a Substations Session at the Winter General Meeting, said that ground networks can be classified into three types, radial system, bus system, and the grid system.

The report stressed the necessity of adequately grounding all non-current carrying installations, even fences surrounding substations, as an accident prevention measure.

"Low over-all impedance, and a current carrying capacity consistent with fault currents obtainable, and a uniform or near uniform potential of earth surfaces in the area under consideration should be the aim of a well designed ground system," the committee observed. "The matter of personnel safety is of special importance as there have been a number of fatal accidents due to high potential differences during line to ground faults. The radial system and the bus system depend on relatively inefficient means of securing contact with the earth, such as buried plates and clusters of driven ground rods. As a result of the wide separation of these grounding points and the wide spacing of the wire connecting them, dangerous voltage gradients can occur within the protected area of the system during faults.

"The grid system uses the principle of the transmission line counterpoise, or buried ground wire, to secure low contact resistance with the earth. The close and uniform spacing of the buried wires will hold the potential gradients along the ground during faults to very low values and will provide lower ground resistance in most soils than other types of ground system. Driven ground rods are usually recommended at each junction of the grid, although in many soils driven rods around the periphery of the grids are adequate.

Scheduled maintenance for high level production

by S. G. Dinkel

Engineer, Apparatus Division
General Electric Company
New Orleans, Louisiana

◆ IN ALMOST EVERY industry today's economy is demanding increasing specialization by manufacturers. The objectives and benefits of this specialization are clear —more know-how on various subjects, better utilization of time, and increased productivity. But one field with broad horizons for future growth will demand the attention of all manufacturers for years to come regardless of their specialty or size. This field is maintenance.

Some of us picture maintenance as a wrench and an oil can. Others as a broom sweeping the office while we are at home asleep. And both pictures are correct. But both are too narrow. For maintenance, if it is to be productive, must be much broader than these two phases alone. A complete definition, therefore, is:

"Productive maintenance is the planned application of men, materials and tools to protect capital investment and increased productivity."

Maintenance is nothing new. It has, by necessity, been practiced since men first supplemented their hands with tools. The only thing that has changed is the increasing recognition of its importance and the increasing need to practice it as a practical means of increasing industrial production. In other terms, how much of every dollar of your manufacturing cost do you charge against maintenance? Remembering that all breakdown time should be charged this way, your maintenance costs are rising sharply.

There are good reasons for your higher maintenance costs. Nearly all of you are occupied with speeding up existing facilities to create extra production and with building or securing better machines to perform more work within a given time at less cost.

In addition to this speed-up, millions of additional workers have been employed in the last few years. These inexperienced men and women with only short apprenticeships are operating highly complex machines and meeting production rates unthought of ten years ago. Paralleled with the increased use of relatively inexperienced workers and the heavy-duty cycle being imposed upon old machines is the trend toward automation—the use of complex machines that will handle complete manufacturing phases automatically.

But each of these attempts to

This article is adapted from an address made before the recent New Orleans Industrial Productivity Forum presented by Louisiana Power and Light Co., New Orleans Public Service, Inc., and General Electric Co.

Among those in attendance at the G-E Industrial Productivity Forum were: (left to right) Fred W. McChesney, manager of industry sales procedures, General Electric Co., Schenectady, N. Y.; S. L. Drumm, vice-president, New Orleans Public Service, Inc.; G. C. Rawls, vice-president, Louisiana Power and Light Co.; H. Chester Gause, manager, industrial power sales, Alabama Power Co., Clarence M. Kilian, advertising manager, Alabama Power Co.; and R. H. Jackson, manager G-E apparatus sales, Southeast, Atlanta.

increase your production has increased your problem of maintenance. The older machines run at higher rates require systemized and frequent servicing and, with the trend toward automation, the importance of a single machine is increased. The continuous operation of process and production lines has become directly related to the performance of one new machine.

All successful maintenance operations require the wholehearted cooperation of the vendor of the equipment being maintained. In the case of the electrical equipment being installed in your plant, you should insist that the supplier fulfill certain obligations.

Use the manufacturer

Remember, the manufacturer of your electrical equipment has a sincere desire to assist you with factual information on how to maintain that equipment. It is to his definite advantage to do so for the continuity of service of his equipment will influence your future purchases. To take advantage of his experience, see that:

1. Equipment supplied to you is designed to require a minimum of maintenance. Where routine maintenance requires the replacement of wearing or burning parts, every effort should be made to influence the manufacturer to design the equipment or device to permit rapid and easy servicing.

2. On either new equipment or old—insist that reliable recommendations be made by the supplier for renewal parts stock. This is not done automatically as many purchasers are not "maintenance-minded" and the effort would be wasted. The compilation of these data is long and arduous and is only performed where both you and the supplier will benefit.

3. See that data supplied when you purchase equipment is sufficient to insure prompt repairs. You should request the equipment manufacturer to give you bulletins or catalogs to be used in the event of the failure of a machine or device. This information will help your maintenance man select the proper repair parts from your stock.

4. Ask the supplier to help you establish a "scheduled overhaul" program. The manufacturer of the equipment has a responsibility to work with you to establish a good program of machine overhaul, repair, and modernization. He understands the equipment and is in a position to furnish you valuable knowledge.

You should now consider two main fields essential to a successful productive maintenance program in your plant—routine maintenance and scheduled overhaul.

First, let us discuss routine maintenance as it applies to most operations.

1. Routine or day-by-day maintenance calls for "periodic inspection" and minor "parts replacement" to prolong the life of the equipment and keep it in good operating condition. To do this job well, requires your support in the form of adequate maintenance budget and your encouragement to:

(a) Establish a well-balanced stock of parts.

(b) Install a good card record system.

(c) Supply adequate tool and repair shop facilities.

(d) Use well-trained personnel.

Whenever electrical equipment is purchased or installed, the routine maintenance needs of that equipment should be carefully analyzed. We all realize that a small part, such as a carbon brush or contact tip, can cause an equipment outage for hours. This will invariably occur when production is most urgently needed.

Study maintenance needs

A number of companies require that *every time* electrical equipment is installed, the electrical and mechanical maintenance men get together and analyze the routine maintenance needs along the following pattern—

1. What parts are most subject to failure?

2. Discussion with the operating group to evaluate the *functional importance* and duty cycle of the equipment.

3. They calculate:

(a) The time required to make minor repairs, if the needed parts are available.

(b) They estimate the cost of breakdown, per hour or shift.

4. From this complete analysis they can determine what parts should be stocked for routine maintenance.

"Planned overhaul" is the big brother of "routine maintenance" and is intended to prolong the life of machines and equipment and keep them in proper operating condition. It includes the rebuilding, reconditioning, and modernization beyond the scope of "routine maintenance." The following comments are applicable only when a well organized "routine maintenance" program is being followed. The two programs go hand in hand and cannot be separated if proper maintenance is your goal.

The fundamentals of "planned overhaul" are graphically illustrated by plotting a curve of the theoretical maximum production capacity of a machine against the actual production results for a certain period of time. Such a curve will show the amount of lost production due to breakdowns. When "planned overhaul" is in effect for a period of time, and a similar curve is plotted, the increased production resulting from the planned overhaul program will be readily apparent.

It is often difficult to predict what machine in your plant should be overhauled to prevent breakdowns. Visual and electrical inspections and tests of machine windings cannot determine the condition of the inaccesible windings. A machine kept religiously clean, the windings periodically varnished and given good routine maintenance is still subject to turn-to-turn short circuiting of the conductors.

Then, on what basis should we establish our "planned overhaul"? One good bench mark is age and service given the windings. In determining at what age a certain machine should be rewound you should consider duty-cycles ,surges, overloading, etc. All these factors contribute to the oxidation of the materials used in the manufacture of the windings. We all are interested, however, in taking the gamble out of manufacturing, as far as practicable, and putting manufacturing processes on a secure and reliable basis.

Planned overhaul

There are six principal considerations when formulating the "planned overhaul" of installed machines.

1. The age of the machine since purchase or latest overhaul.

2. The function and productive importance of the machine. If the machine is in a key position with relation to other operations, compare "breakdown" cost against "planned overhaul" cost.

3. The probable retirement or replacement of the machine.

4. Past experience on similar machines that operated under the same conditions.

5. Consideration of the reconditioning of dependent or secondary equipment at the same time.

6. Attempt to maintain the aver-

(*Continued on page* 83)

Know the law . . .

Trouble points that arise in contracts

by Arthur L. H. Street

◆ THE OWNER of a building requests an electrical contractor to submit an estimate of the cost of certain work, the nature of which is detailed. The contractor says that the job will cost not less than a certain sum, and not more than a certain sum. The owner tells the contractor to go ahead. Can the contractor charge the higher figure if that is more than the reasonable value of the work done?

According to a decision of the Maryland Court of Appeals, the answer must be "no," and most courts would be apt to agree on that point. In deciding the case of Seybolt v. Baber, 97 Atl. 2d 907, the court thus summed up, in effect, these basic rules:

Where a contract to furnish services and materials does not specify the price to be paid, the contractor does not have a right to arbitrarily fix the price when the work is completed. The law says that, by leaving the matter open, they have indicated that the price is to be no more and no less than what is reasonable. (Obviously, to leave the matter open in this way is to lay the ground for dispute and litigation.)

Price is binding

If the contract fixes a definite price, it is binding whether above or below a reasonable price. (This assumes that the owner has not been induced to agree to the figure through a fraudulent representation by the contractor on such matters as costs of labor or materials. It is also assumed that there has been no substantial change in the nature or extent of work to be done. If extras are ordered without agreement as to price, the owner would be bound to pay the reasonable value of the same.)

The Court of Appeals said: ". . . Where one party desiring certain work performed requests an estimate of the cost, and the other party submits an estimate that the proposed work will cost not less than a certain sum and not more than another sum," and "the first party directs the second party to perform the work, no contract for a specific sum arises, and the second party can recover the reasonable value of the services rendered but not exceeding the larger sum."

Execution of agreement

A decision by one of the Louisiana Courts of Appeal illustrates how a contractor may be excused from full performance of an agreement. An electrical contractor agreed that in addition to installing wiring, etc., he would hang fixtures to be furnished by the owner. The owner unreasonably delayed furnishing the fixtures after the wiring had been completed, although the contractor repeatedly demanded that they be furnished. The city electrical inspector insisted that the exposed wires where the fixtures were to be hung be capped, and the contractor did it at an expense equal to the cost of hanging the fixtures. The court decided that the owner could not later require the contractor to reimburse him for what was paid another contractor to hang the fixtures. (Amedeo v. Owens, 64 So. 2d 867.)

Specify trench refills

Where an electrical contractor is required to excavate trenches in which he is to lay electrical ducts, under a subcontract with a general building contractor, the subcontract should specify whether or not the electrical contractor is to refill the trenches.

This thought is suggested by a decision rendered by the Minnesota Supreme Court in a case involving construction of a Veterans Hospital. The court awarded an electrical subcontractor extra pay for refilling trenches on demand of the general contractor. The subcontract did not specify whether or not it was to include refilling or backfilling, but merely required the subcontractor to "do the electrical work . . . as per plans and specifications." The specifications provided that all filling, backfilling, and grading required by any new construction must be performed by the contractor for general construction. (Sagl v. Hirt, 52 N. W. 2d 721.)

(Note: In preparing material for this "Know the Law" Department of ELECTRICAL SOUTH, the writer attempts, so far as feasible, to confine cited court decisions to those rendered by the appellate courts of the Southern and Southwestern states. However, judges throughout the country are strongly influenced by what the appellate courts of other states have decided, where there is no local decision on a given point. So, because there may be no other decision on the precise point involved in the Minnesota case—obviously a very important point—we have cited that case.)

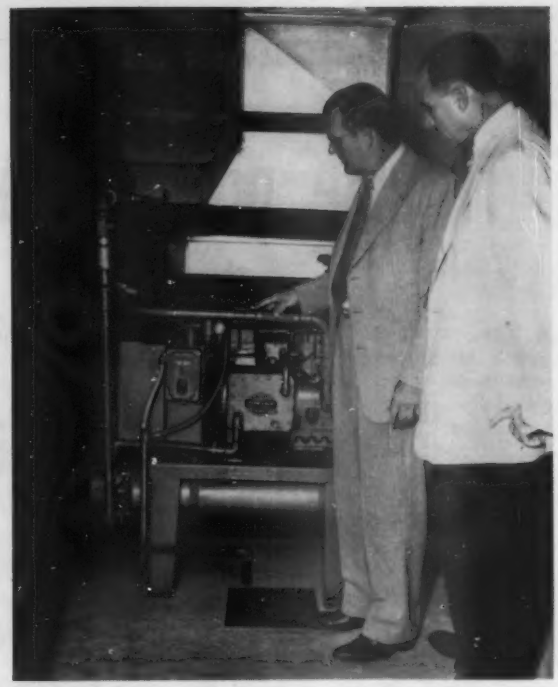
Defective work waiver

Most courts agree that if an owner of a building accepts and pays for work performed by a contractor, knowing that the work is defective in some respect, he will not be permitted later to collect damages from the contractor on account of such defects. But there are exceptions to this rule, as shown by a decision of the Georgia Court of Appeals in the case of McKee v. Wheelus, 85 Ga. App. 525, 69 S. E. 2d 788. In that case it was decided that the fact that the owner has paid for work does not conclusively show an acceptance of the job as conforming to contract requirements; and that where payment was made upon an assurance that defects would be remedied, the owner did not waive right to claim damages on account of defects known to him and on account of defects later discovered. It would seem that the same rule should apply to payment by a general contractor to an electrical subcontrac-

(*Continued on page* 84)

Reverse refrigeration for school heating

by W. H. Knowlton



Guy C. Hall, left, of Florida Power Corp., and F. T. Christian, school superintendent, look over one of 47 heat pump units in Pinellas schools.

◆ SIX NEW SCHOOLS in Pinellas County, Florida, have established an entirely new pattern in the mechanical equipment of commercial buildings by using refrigeration equipment for heating. Operating costs of the systems compare favorably with oil heating, and the refrigeration capacity, of course, is available for summer air conditioning. Advantages of the "heat pump" systems, now proved by the first year of operation, have been so marked that four new high schools in the community will be similarly equipped.

Each of the new school buildings is equipped with the requisite number of 7½ hp self-contained heat pumps which extract heat from well water pumped from the water table under the ground. Thus the heat obtained is literally "pumped from the ground" and transferred to the building through a network of pipes buried in the floor slab of each room. The water is not wasted, but is returned to the ground through a disposal well. Capacity of the refrigeration units is available for summer cooling of auditoriums, cafeterias, gymnasiums, and other public rooms.

Schools in Pinellas County now equipped with heat pump systems include the 74th Street Elementary School and the 16th Street Junior High School in St. Petersburg, as well as elementary schools in Largo, Tarpon Springs, Clearwater, and the Seminole County School.

It was not easy for school officials of Pinellas County to cast aside time honored heating methods and adopt mechanical refrigeration systems as a source of heat. No school board, responsible to the people of the community, wants to make costly mistakes, and the Pinellas County Board was no exception.

While the theory of heating by "reverse-cycle" refrigeration has long been known, and plenty of successful heat pump installations made, school building experience was non-existent. No similar installation, in buildings of this size and character had ever been attempted.

Objections unfounded

Opponents of the plan insisted, in absolute good faith, that the proposed "heat pumps" would cost too much to install, that operating costs would be way out of reason, and that the available water supply might fail. In practice the opposite proved to be true of the system.

Fortunately, the school board chairman was A. Franklin Green, a retired Ford Motor Company executive with years of mechanical experience. Mr. Green quickly sensed the many reasons why heat pump systems would help give Pinellas County the best equipped and operated educational plant in the country—and this was his objective.

The board's architect, Philip F. Kennard, who is also a registered engineer, approached the equipment selection problem with an open mind. With Mr. Green, he assembled all available data on heat pumps, much of it furnished by Allen Dean, Florida representative of Acme Industries, Inc., of Jackson, Michigan.

Considerable assistance was also obtained from Guy C. Hall, of Florida Power Corp., a refrigeration engineer whose interest in heat pumps has been largely responsible for Florida leading all states in the number of heat pumps installed. Since the new schools have been open, Mr. Hall has accumulated extensive test data and operating costs, which will be of great value to schools, and others, in planning future systems.

Operating cost study shows heat pump comparison with other fuels

Fuel	Rate per Unit	BTU per Penny	Probable Efficiency	Net Useful BTU per Penny
Coal	$20.00 ton	13,000	60%	7,800
Oil	.14 gal.	10,350	75%	7,750
Gas	.85 M	11,750	75%	8,800
Electric	.02 KWH	1,706	100%	1,706
Heat Pump 70° Well to Radiant	.02 KWH	8,850	90%	7,970
50° Well to Radiant	.02 KWH	7,450	90%	6,700

Analysis of heat pump operation costs for season 74th Street Elementary School*

	Degree Days	KWH Used	Cost
October	24	196.6	$ 8.37
November	42	351.7	15.47
December	107	939	29.11
January	112	947	38.61
February	50	759.6	23.55
March	10	139	6.95
April	0	55.58	2.78
Totals	345	3,508	$127.62

(*) Equipment included one 7½ hp unit for heating and cooling Cafetorium, plus four 7½ hp units for heating. Total 37.5 hp.
Data in both tables compiled by Guy C. Hall, Florida Power Corp.

The elementary school at Tarpon Springs, Florida, is typical of the Pinellas County schools which recently installed heat pumps.

After many months of investigation, the Pinellas County School Board and its advisors selected the "Flow-Temp" heat pump, manufactured by Acme Industries, a pioneer in the refrigeration field. Seven and one-half hp units were adopted as standard, because a unit of this size proved to be adequate for one class room wing of the schools. A total of 47 units were installed. Standardization on a single size meant that all parts would be inter-changeable, and that the compliment of service parts carried could be held to an absolute minimum.

Radiant floor heating was also selected by the board, because of the even heat distribution made possible by this method. No floor space was taken up by radiators or convectors, and the problem of drafts and streaked walls were eliminated.

Design of the systems

From its inception, the project was coordinated by Carl W. Millsom, general sales manager of Acme Industries, who worked with Mr. Kennard, Mr. Dean, and Mr. Hall to develop the most efficient systems possible for each school. A test installation of a single unit in an addition to the existing Seminole School quickly proved that 113 degree F. water, produced by reverse refrigeration, would be adequate to meet heating requirements.

The largest installation, in the 16th Street Junior High School, included seventeen 7½ hp and one 3 hp units—a total of 130.5 hp. Five 7½-ton units are used for both heating and cooling, producing 45 degree F. chilled water for use with a duct system. By this method summer air conditioning is provided in the cafeteria and "gymnatorium."

Twelve 7½-ton and one 3-ton units were used in classroom wings and the administration building for floor panel heating only. In this instance, however, the piping was designed to handle separate room air handling units for future cooling. In other words, provision was made for air conditioning the entire building at any time in the future, simply by adding the necessary air handling and refrigeration equipment.

Safety and cleanliness were prime factors considered by the board in the selection of heat pumps. Because there is no fire hazard, danger to life and property is reduced to an absolute minimum. No fuel is stored on the premises so danger of explosion is thereby reduced. Further, no part of the system ever gets hot enough to cause fire or explosion, and the need for insurance of the type normally carried on heating boilers is eliminated.

Complete cleanliness is assured by freedom from smoke, odors, and dirt resulting from products of combustion. Because each heat pump is factory assembled and

(*Continued on page* 85)

NEMA Fan Section announces contest rules

◆ NUMEROUS SALES HELPS will be available in 1954 to stimulate the promotion of fan sales. These materials will be offered by the members of NEMA's Electric Fan Section in connection with their 1954 fan window display contest.

This material will include a beautiful new window streamer, four-page folder showing pictures of last year's prize-winning windows and including numerous window display suggestions, also "Facts about Fans"—the manual for fan salesmen. This manual gives a comprehensive story on all types of electric fans, with suggestions on how to display and sell them. It tells not only how they provide summer comfort, but suggests many auxiliary uses for fans the year 'round, as an aid to housekeeping.

Manual for retailers

It tells how to choose the proper fan, how fans should be used in the average home, how many and what types are needed to do the job—all as a guide to selling a fan "installation"—not just a fan. Also described is how fans can be used as an adjunct to air conditioning—and there are many other facts and suggestions of interest to every retailer who sells electric fans.

Single copies of this manual, the window streamer and suggestions folder may be obtained without charge by writing the Electric Fan Section, National Electrical Manufacturers Association, 155 East 44th Street, New York 17, N. Y.

The Section announced recently that the "May Days are Fan Days" 1954 electric fan window display contest will be bigger and better than ever. Last year's contest was a huge success—and prizes this year have been made more attractive than ever—with a total of $3,000 in United States Savings Bond prizes being offered. These prizes are for the best window displays of electric fans during the period of the contest, which begins May 1st and ends at midnight June 1st, 1954. This contest is open to all who display or sell electric fans.

Robert A. Orr, of the General Electric Company, chairman of the NEMA Electric Fan Section Merchandising Committee says, "The 1953 window display contest proved that aggressive retailers can build volume business on electric fans by starting their selling efforts early, and by putting real selling effort behind this product. Entries for last year's contest were received from 22 states and the District of Columbia. At a luncheon attended by the judges, a new era in electric fan selling was predicted. Instead of sales being made on an opportunist basis, as in the past (that is, putting fans on the counter when a heat wave comes along), dealers are finding that the time to sell fans is not when it's hot, but when it's *not*.

"We have definite evidence that fan distributors and dealers are learning the importance of early pre-season stocking. This is proved by the fact that domestic shipments of free-air circulating fans, and wall and window ventilating types by those manufacturers reporting to NEMA for the first 5 months of 1953, were 86 per cent ahead of shipments for the same period the previous year. In 1953, the first 5 months, they amounted to $23 million. In 1952, same period, $12,500,000.

Expect record entries

"So you can see why we feel very optimistic about the 1954 electric fan window display contest, and why we expect far more entries than 1953's record number."

Everybody has a chance in the electric fan window display contest. It's not necessarily the biggest store that will win, nor the biggest display. Winners are chosen on the basis of ingenuity and originality. Also, to make everyone's chances better, prizes this year are in two categories.

The prizes this year are bigger than ever. In addition to the $1,000 United States Savings Bond Grand Prize (for which all contestants are eligible), there are 14 additional awards totalling $2,000 in United States Savings Bonds — a grand total of $3,000! These prizes are to be distributed as follows:

To appliance retailers — one $500 bond, one $250 bond, and five $50 bonds — 7 United States Savings Bond prizes in all for this classification.

To department stores and electric light and power companies there will also be—one $500 bond, one $250 bond, and five $50 bonds, making another 7 United States Savings Bond prizes in this class.

Through this division of prizes, the little store in a small town has just as much opportunity to win a prize as the largest department store or electric light and power company.

How to enter

The requirements are simple. As stated in the rules, the window must feature electric fans exclusively, and the display must remain for at least a period of one week during the month of May.

A photograph or snapshot of the window must be sent to the Fan Window Display Contest, Electric Fan Section, National Electrical Manufacturers Association, 155 East 44th Street, New York 17, N. Y. All entries must be postmarked not later than midnight, June 15, 1954.

On the back of each photograph or snapshot, the following information must be printed: name of person installing the display; name and address of the store; date and length of time the display was in window; type of store — department store, electric light and power company, general, hardware, jewelry, appliance, etc.; name of distributor and distributor's salesman serving the retailer.

All window displays must include the streamer provided by the Electric Fan Section to qualify for award. This streamer is provided free upon request.

As many entries as desired may be sent in, and all prize winners will be announced as soon as possible after the close of the contest. The individual who submits each winning entry will receive the prize. If prize money is to be divided among two or more people in any store, the store's management will determine division of prizes.

Where vibration, motion or shock loosen connections . . .

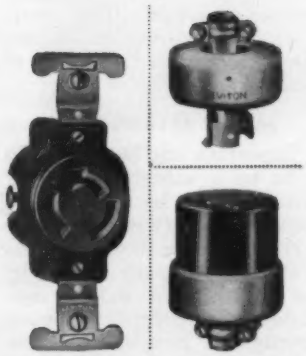
USE LEV·O·LOCK DEVICES

for UNINTERRUPTED POWER FLOW

Just a turn of the cap makes a secure connection that will not shake loose . . . that will provide safe, dependable electrical connections under severe usage. *LEV-O-LOCK* devices incorporate every up-to-date advantage in engineering design, made available by Leviton's half-century experience as leader in the wiring device field.

Contacts are double wiping type in all receptacles, and are made of heavy gauge phosphor bronze; extra large terminal screws and ample wiring room provided; quality controlled mass production assures accurate alignment of blades.

Send for bulletin LL



LEV-O-LOCK devices are available in 2-3-4 wire caps, connectors and receptacles in 10 and 20 Amp ratings. Approved by Underwriters' Laboratories.

LEVITON MANUFACTURING COMPANY

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Savings expected from pole research

◆ A TWO-YEAR RESEARCH program expected to save industrial users millions of dollars in pole costs by establishing more precisely the breaking strength of wood poles has been started by the American Society for Testing Materials. A fund of $150,000 is being raised to finance the work; and industries producing, treating, and using poles have already pledged or allotted sufficient funds to justify a start. The research is being conducted at the U. S. Forest Products Laboratory, Madison, Wisconsin, under the supervision of a technical subcommittee with R. P. A. Johnson as chairman.

Committee plans research

The research program has been under development for several years by ASTM Committee D-7 on Wood, with the close co-operation of various interested agencies, according to L. J. Markwardt, chairman of the committee. As now planned, tests will be made on about 600 full-size poles of different species, and on some 15,000 small specimens taken from the poles to determine the quality of the clear wood. The research is designed to replace existing inadequate and conflicting data on pole strength with a solid basis of technical information for revised specifications, according to Markwardt.

Objectives of the program are:

1. More accurate pole design standards.
2. Greater assurance of getting poles that are strong enough at reasonable cost.
3. New information on the effect of preservatives on pole strength.
4. Better specifications that establish accurate relationships among different species.
5. Substantial savings to buyers and processors of poles.

Data now in use are contradictory and unreliable, Markwardt points out. Inconsistencies penalize buyers in two ways. With some species, the buyer may be paying for unneeded strength, while with others he may not be getting adequately strong poles and, as a result, has inordinately high maintenance costs.

Stress values assumed

Allowable stresses on species used for many years were originally developed from assumed values known to be safe and published in early editions of the National Electrical Safety Code. These assumed values did not recognize inherent strength differences among species, however, and consequently the allowable stresses were gradually increased as field experience was gained and breaking tests were made on full-length poles. Inadequate test controls, however, resulted in inconclusive and sometimes misleading data.

Further complicating the problem for pole users, Mr. Markwardt says, is the fact that new pole species have come into use, for which allowable stresses have been developed from bending tests of small, clear, green specimens by converting the test results to pole stresses by means of a theoretical ratio.

When the present standards were adopted by the American Standards Association, Mr. Markwardt points out, the committee in charge recognized the inconsistencies and recommended further research. The fact that the National Electrical Safety Code is being revised gives another incentive for doing the research now, so that revised stress ratings can be incorporated in it.

Tests will vary

The research includes tests on about 600 full-size poles of western red cedar, Douglas-fir, lodgepole pine, loblolly pine, longleaf pine, shortleaf pine, slash pine, and western larch, all collected in the woods and authentically identified as to species. Supplementary tests will be made on small, clear specimens cut from each pole, in order to relate the results with those of the full-size pole tests. Such a relationship should facilitate quick, low-cost rating of new species in the future by means of economical tests.

In developing the proposed program, ASTM first investigated methods of testing full-length poles and adopted two standard test methods. One, the crib test, stimulates service conditions. The other, the machine test, is cheaper, less cumbersome, and more accurate, and should give as good if not better information.

Correlation of methods

The first step will be to correlate the two methods of testing, controlling and recording such major variables as density, species, major defects, and moisture content, and averaging uncontrollable variables by testing a sufficient number of poles. With the desired correlation established, tests can be concluded by the cheaper method.

The second step in the program is the determination of the basic strength of untreated poles, or, poles "in the white," for various species. This is necessary because a base is required to determine the effect of various treatments and treating conditions upon the strength of poles of various species.

The third step will consist of tests of treated poles. Each species tested will be given a type of treatment permitted by the treating specifications for that species and used in current commercial practice. In all of the testing, major controllable variables in the pole timber will be controlled and their effect upon the pole strength determined. Uncontrollable variables will be evaluated to the extent possible within the limits of the money available.

Moduli of rupture

An important and what should prove to be a valuable result of this program will be a more precise correlation between the moduli of rupture of small clear specimens and the strength of a pole. In the future, this should save the industry considerable money in investigating new species, new treatments, new preservatives, and different treating conditions, since the necessary information can be

(*Continued on page* 84)

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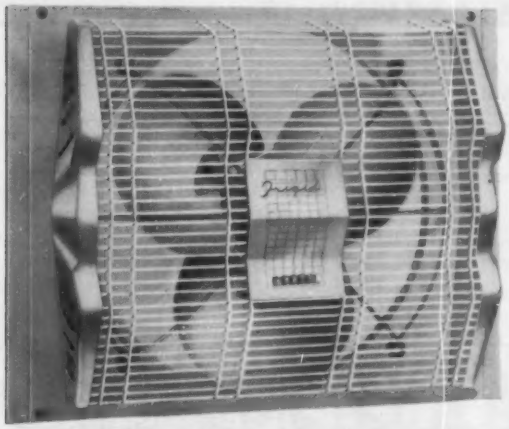

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HOW TO USE ESTIMATING TABULATIONS

THE ELECTRICAL estimating tables provided as Section III of ELECTRICAL SOUTH'S Data Sheets are for labor only and are arranged alphabetically with the basic material headings as a title for each tabulation designating the kind of material and type of installation. This permits the Data Sheets to be filed in alphabetical order.

Labor units given in these tabulations are based on a minimum of interference with production. The averages listed do not provide for abnormal job conditions, and any such abnormal conditions will require adjustments by the user, based on his experience and the evaluation of the job to be estimated.

The work units are composed of one or more separate but closely related operations necessary for the complete installation of a particular basic item of electrical equipment. These separate operations associated with the basic material are described at the bottom of each tabulation.

Most of the electrical estimating tabulations follow the same form. Column 1 at the left shows the size of the material to be installed. The second column from the left gives the time required to install the material, and it should be noted especially that this productivity column may be based on individual units, or in the case of cable and conduit on units of 100 feet or 1,000 feet. The abbreviations "Ea." for each, "C" for hundreds, and "M" for thousands will appear in the heading of Column 2 to indicate the units for which the labor in hours applies.

Columns 3 to 13 inclusive show the labor costs in dollars per unit at various hourly wage rates.

When calculations are being made for an hourly wage rate that doesn't correspond to the rates given in the columns 3-13, the user may multiply the number of hours in Column 2 by 100 and this will give the labor cost based on an hourly wage rate of $1 per hour. By multiplying this by the hourly wage rate that actually applies, the exact cost may be obtained, but it must be realized that this will be in units of 100 feet or 1,000 feet if the productivity rate of Column 2 is based on such units.

Labor units represent direct job costs and do not include delivery of material to the job, engineering, estimating, or any other indirect cost.

As will be noted, some of the electrical estimating tabulations given are for intermittent operations, such as excavating, backfilling, etc. These are included for use in preparing estimates on work of a special nature not covered under a specific heading.

ARMORED BUSHED CABLE
NEW WOOD RESIDENCES

NO CONDR'S. SIZE	HRS.-"C"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES									
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
2/14	4.1	.051	.062	.072	.082	.092	.103	.113	.123	.133	.144	.154
3/14	4.4	.055	.066	.077	.088	.099	.11	.121	.132	.143	.154	.165
4/14	4.6	.058	.069	.081	.092	.104	.115	.127	.138	.15	.161	.173
2/12	4.1	.051	.062	.072	.082	.092	.103	.113	.123	.133	.144	.154
3/12	4.4	.055	.066	.077	.088	.099	.11	.121	.132	.143	.154	.165
4/12	5.5	.069	.083	.096	.11	.124	.138	.151	.165	.179	.193	.206
2/10	4.4	.055	.066	.077	.088	.099	.11	.121	.132	.143	.154	.165
3/10	4.8	.06	.072	.084	.096	.108	.12	.132	.144	.156	.168	.18
4/10	5.5	.069	.083	.096	.11	.124	.138	.151	.165	.179	.193	.206
2/8	4.8	.06	.072	.084	.096	.108	.12	.132	.144	.156	.168	.18
3/8	5.5	.069	.083	.096	.11	.124	.138	.151	.165	.179	.193	.206
4/8	6.2	.078	.093	.109	.124	.14	.155	.171	.186	.202	.217	.233
2/6	5.7	.071	.086	.10	.114	.128	.143	.157	.171	.185	.20	.214
3/6	6.5	.081	.098	.114	.13	.146	.163	.179	.195	.211	.228	.244
4/6	7.3	.091	.11	.128	.146	.164	.183	.201	.219	.237	.256	.274
2/4	6.9	.086	.104	.121	.138	.155	.173	.19	.207	.224	.242	.259
3/4	7.7	.096	.116	.135	.154	.173	.193	.212	.231	.25	.27	.289

LABOR: INCLUDES DRILLING, CUTTING, INSTALLATION & STRAPPING & CONNECTED TO BOXES - NO TAPS OR CONNECTIONS.

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1. Meter Service Entrance Switch. 2. Entrance and Transformer Switch. 3. Fuse Puller Switch for service entrance and branch circuit protection. 4. Fuse Puller Switch with raintight enclosure. 5. Residence Panel, two to twelve circuits. 6. Type NTPS Switch and Fuse Panel, six or twelve circuits. 7. Trumbullite Circuit Breaker Load Center, two to twenty circuits. 8. 16-Circuit Split Bus Load Center provides four 2-pole and eight single-pole circuits for the large fully-equipped home. 9. Load Center with wired-in Four Point Meter Socket in raintight enclosure. 10. General Use Safety Switch, 30-200 amps. 11. General Use Safety Switch with raintight cover.

CONDUIT IN WOOD WAREHOUSES

SURFACE MOUNTED

THIN WALL

COND. SIZE	HRS. PER "C" FT.	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	5.1	.0638	.0765	.0893	.102	.1148	.1275	.1403	.153	.1658	.1785	.1913
3/4"	5.5	.0688	.0825	.0963	.11	.1238	.1375	.1513	.165	.1788	.1925	.2063
1"	6.5	.0813	.0975	.1138	.13	.1463	.1625	.1788	.195	.2113	.2275	.2438
1 1/4"	8.7	.1088	.1305	.1523	.174	.1958	.2175	.2393	.261	.2828	.3045	.3263
1 1/2"	10.9	.1363	.1635	.1908	.218	.2453	.2725	.2998	.327	.3543	.3815	.4088
2"	13.9	.1738	.2085	.2433	.278	.3128	.3475	.3823	.417	.4518	.4865	.5213

RIGID

1/2"	5.8	.0725	.087	.1015	.116	.1305	.145	.1595	.174	.1885	.203	.2175
3/4"	6.3	.0788	.0945	.1103	.126	.1418	.1575	.1733	.189	.2048	.2205	.2363
1"	7.4	.0925	.111	.1295	.148	.1665	.185	.2035	.222	.2405	.259	.2775
1 1/4"	9.9	.1238	.1485	.1733	.198	.2228	.2475	.2723	.297	.3218	.3465	.3713
1 1/2"	12.5	.1563	.1875	.2188	.25	.2813	.3125	.3438	.375	.4063	.4375	.4688
2"	15.9	.1988	.2385	.2783	.318	.3578	.3975	.4373	.477	.5168	.5565	.5963
2 1/2"	20.3	.2538	.3045	.3553	.406	.4568	.5075	.5583	.609	.6598	.7105	.7613
3"	26.7	.3338	.4005	.4673	.534	.6008	.6675	.7343	.801	.8678	.9345	1.00
4"	41.2	.515	.618	.721	.824	.927	1.03	1.133	1.236	1.339	1.442	1.545
5"	68.2	.8525	1.023	1.194	1.364	1.535	1.705	1.876	2.046	2.217	2.387	2.558
6"	96.2	1.203	1.443	1.684	1.924	2.165	2.405	2.646	2.886	3.127	3.367	3.608

NOTE FOR HANGER INSTALLATION: FOR ONE PIPE OR A SERIES OF PARALLEL RUNS ON A HANGER, REDUCE ABOVE FIGURES BY 33⅓ AND ADD FOR INSTALLATION OF HANGERS AS REQUIRED.

LABOR: INCLUDES DRILLING, CUTTING & THREADING, & INSTALLATION OF CONDUIT, CONNECTING TO BOXES AND SUPPORTING. (NO WIRE OR TAPS).

OVERHEAD SERVICE RACKS - WITH INSULATORS

WOOD MOUNTED

NO LINE COND'R	COND'R SPACING	HRS. EA.	LABOR COST INSTALLED EACH AT FOLLOWING RATES									
			$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1		.35	.44	.53	.61	.70	.79	.88	.96	1.05	1.14	1.23	1.31
2	4"	.5	.63	.75	.88	1.00	1.13	1.25	1.38	1.50	1.63	1.75	1.88
2	6"	.55	.69	.83	.96	1.10	1.24	1.38	1.51	1.65	1.79	1.93	2.06
2	8"	.65	.81	.98	1.14	1.30	1.46	1.63	1.79	1.95	2.11	2.28	2.44
2	12"	.75	.94	1.13	1.31	1.50	1.69	1.88	2.06	2.25	2.44	2.63	2.81
3	4"	.8	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00
3	6"	.85	1.06	1.28	1.49	1.70	1.91	2.13	2.34	2.55	2.76	2.98	3.19
3	8"	.95	1.19	1.43	1.66	1.90	2.14	2.38	2.61	2.85	3.09	3.33	3.56
4	4"	1.0	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75
4	6"	1.05	1.31	1.58	1.84	2.10	2.36	2.63	2.89	3.15	3.41	3.68	3.94
4	8"	1.15	1.44	1.73	2.01	2.30	2.59	2.88	3.16	3.45	3.74	4.03	4.31

CONCRETE MOUNTED

1		.6	.75	.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25
2	4"	.95	1.19	1.43	1.66	1.90	2.14	2.38	2.61	2.85	3.09	3.33	3.56
2	6"	.95	1.19	1.43	1.66	1.90	2.14	2.38	2.61	2.85	3.09	3.33	3.56
2	8"	1.0	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75
2	12"	1.1	1.38	1.65	1.93	2.20	2.48	2.75	3.03	3.30	3.58	3.85	4.13
3	4"	1.3	1.63	1.95	2.28	2.60	2.93	3.25	3.58	3.90	4.23	4.55	4.88
3	6"	1.45	1.81	2.18	2.54	2.90	3.26	3.63	3.99	4.35	4.71	5.08	5.44
3	8"	1.5	1.88	2.25	2.63	3.00	3.38	3.75	4.13	4.50	4.88	5.25	5.63
4	4"	1.6	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00
4	6"	1.65	2.06	2.48	2.89	3.30	3.71	4.13	4.54	4.95	5.36	5.78	6.19
4	8"	1.7	2.13	2.55	2.98	3.40	3.83	4.25	4.68	5.10	5.53	5.95	6.38

LABOR: WOOD - INSTALL & SET SCREWS & INSTALL RACK.
CONCRETE - DRILL, SET & SECURE ANCHOR AND INSTALL RACK.

Electrical Estimating—III

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LIGHTING EQUIPMENT APPLICATIONS

THE INTELLIGENT application of lighting fixtures and control devices requires a knowledge of the terminology and measurements used, as well as the principles involved with various types of lighting installations, the equipment available, and the special considerations that must be taken into account in the application of specific types of equipment. These various factors are discussed briefly in the following pages.

Terminology and Measurements

Four important quantities are involved in lighting studies and measurements: luminous intensity, luminous flux, illumination, and brightness.

Luminous intensity: This is a property always associated with the light source. The standard unit of luminous intensity is the International Candle, and the luminous intensity of a source expressed in candles is called candlepower. An ordinary wax candle has a luminous intensity of approximately one candle in a horizontal direction.

It is especially to be noted that the candlepower of most light sources will not be the same in all directions, and the term candlepower therefore indicates the luminous intensity or light density of a light source in one particular direction. In practice, the candlepower of a light source is measured in all directions and plotted in what is designated as a candlepower distribution curve. From such a curve, the candlepower in any given direction may be determined and accurate illumination calculations can be made.

The symbol "I" is used to represent luminous intensity in equations and calculations.

Luminous flux: The total output of a light source can be expressed in terms of lumens, the unit of luminous flux. However, the term lumens is not exclusively a property of a light source, for the term lumens can also be used to indicate the amount of light absorbed, transmitted, or reflected by various surfaces and materials.

The technical definition of a lumen is the light flux emitted through a solid angle from a point source of one candle. Expressed simply, the lumen is the light flux falling on one square foot of the surface of a sphere having a one foot radius when a source of light of one candle intensity is located at the center of the sphere. Since a sphere of one foot radius has a surface of 4-pi or 12.57 square feet, a point source of light having an intensity of one candlepower in all directions will produce 12.57 lumens of luminous flux. From this it follows that the total lumens of any light source is equal to 12.57 times the mean spherical candlepower of the source.

Lighting Equipment Applications—Page 2

The symbol "F" is used to represent luminous flux in equations and calculations.

Illumination: When luminous flux falls upon a surface it is said to be "illuminated." The average illumination on a surface is equal to the flux falling on the surface divided by the area of the surface, thus illumination may be defined as the density of luminous flux incident upon a surface. The unit used in measuring illumination is the footcandle. One lumen of luminous flux distributed uniformly over one square foot of surface will therefore produce an illumination of one footcandle. Another way to express this relationship is in terms of the light emitted by a uniform point source of one candle. The illumination falling upon a surface one foot from, and perpendicular to, such a source is one footcandle.

The quantity illumination, indicated by the symbol "E," and its unit the footcandle are used to a great extent in electrical calculations. It is the quantity measured by light sensitive cells in the form of footcandle meters and visual photometers such as the grease spot photometer.

Brightness: A surface that is emitting, reflecting, or transmitting light possesses brightness. Such brightness is generally independent of the distance of observation and may be measured in terms of luminous intensity in a given direction per unit of area projected in the given direction. Brightness is an important factor in lighting installations because the relative brightness of sources and illuminated surfaces determines the comfortableness of a lighting installation.

Brightness can be expressed in two ways: either in candles per unit area, or in lumens per unit area. When the former way is used the unit of measurement is candles per square inch; in the latter method, the unit of measurement is the footlambert. The first unit is generally used in connection with light sources, while the latter unit is most often used in connection with brightness measurements of surfaces other than light sources. The symbol "B" is used to represent brightness in equations and calculations.

New developments

that help to build business

Flexible lighting with fluorescent dimmers

THE MANY ADVANTAGES of fluorescent lighting have on occasion been offset by the disadvantage that a simple means of dimming these lights has not been available. Consequently, where dimming was required, it was generally necessary to specify incandescent lamps. Now, equipment is available from the General Electric Company's Specialty Transformer and Ballast Department for the dimming of rapid-start fluorescent lamps either for home or commercial use.

Components of the G-E dimming system, excluding lamps, are a dimming ballast for each operating lamp, a thyratron unit, and an intensity selector. The circuit is designed for 40-watt rapid-start lamps.

The dimming circuit requires a 240-volt supply to the electronic control. Brightness is controlled by a selector consisting of a small potentiometer which can be located either at the electronic unit or any convenient place. Special controls might make use of a selsyn-driven potentiometer to provide automatic control in either direction, or a push-button unit with fixed resistors to provide pre-selected brightness.

The dimmer does not depend on varying lamp voltage to control light output; it controls the time during which voltage is applied. Changes in light output result from changes in the length of time that current flows through the lamp during each cycle. Sufficient starting voltage is present over the entire dimming range to initiate and maintain the arc. In order to provide proper cathode temperature at low lamp currents, the cathodes are heated continuously.

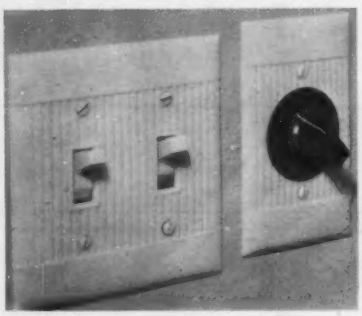
According to G-E engineers, fluorescent lamps on dimming circuits offer several advantages over filament lamps, such as higher efficiency over the dimming range, lower operating costs, and better color control.

While filament lamps become increasingly red as they are dimmed, fluorescent lamps change very little in color over their entire brightness range, they said.

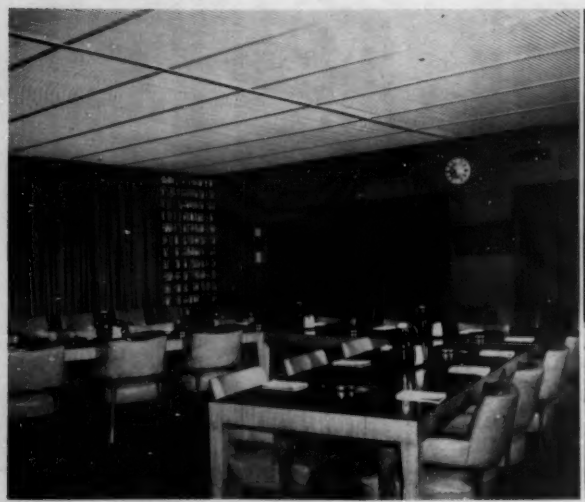
One of the first commercial installations of the new fluorescent light dimming system was completed recently in an executive conference room in the general offices of the Ford Division of the Ford Motor Company.

The dimming system controls 93 40-watt rapid-start fluorescent lamps in the ultra-modern meeting room. The lamps are mounted 34 inches above the semi-transparent plastic sheets to provide lighting of the luminous-ceiling type. They are divided into three groups which can be controlled individually or collectively by three dimming units.

As shown in the accompanying illustrations, the dimming equipment is particularly adapted to residential living room lighting where various levels of light are



The main control switches and dimmers shown are typical of the new equipment for use in residential lighting arrangements.



Fluorescent lamps in this modern conference room are mounted above semi-transparent plastic sheets. Dimming of the lamps is controlled by three electronic dimming units and a brightness selector as shown at right.

FREE BOOKLET !

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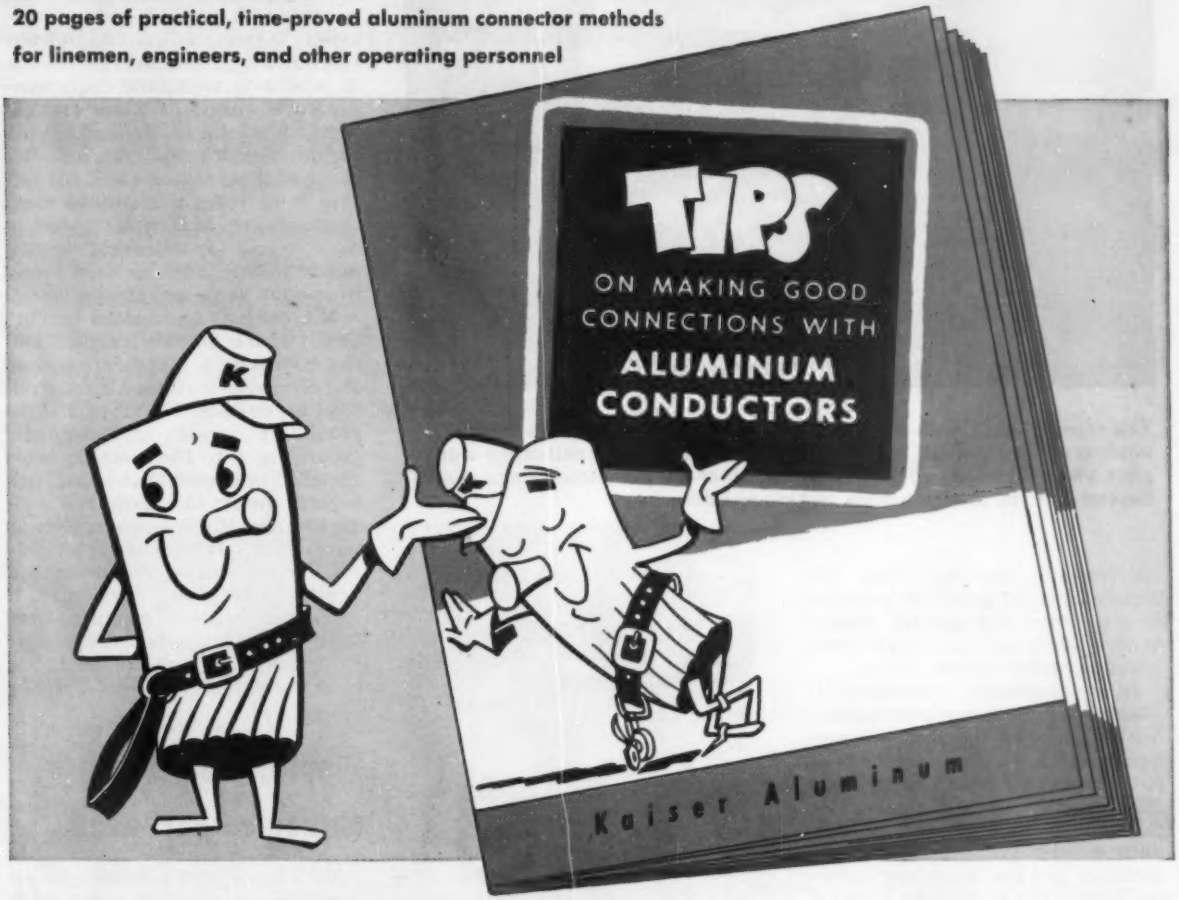

Here are a few of the many questions answered by this valuable little booklet:

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- How can you increase the contact area at connections?
- When should spacers be used?
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- How can moisture be kept out of connections?
- When should armor tape be used?
- Why should aluminum be above copper when connecting the two metals?

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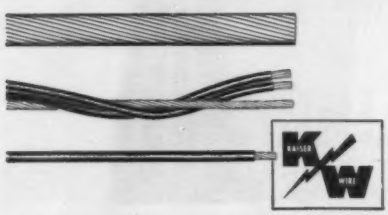

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Name_____
Position_____
Company_____
Street Address_____
City and State_____

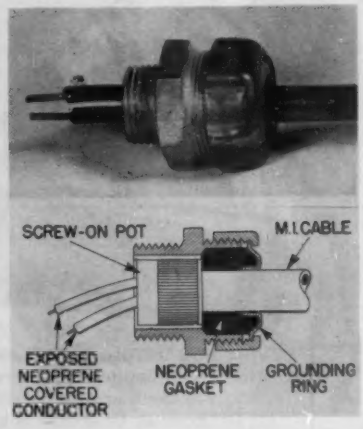
This room is lighted with a fixture arrangement over each of the two picture windows at the front and back of the room, and a recessed unit in the mantel piece which is covered with frosted glass. All of the fluorescent lamps can be dimmed with the special manual controls and dimmer.

required for different uses. The dimmer control switch is mounted in a standard box and the control knob mounts on a box cover plate which matches switch plates.

In the residential installation illustrated, three lamps are mounted behind each of the two valances over picture windows which look out into the front and back yards. The seventh light is recessed in the fireplace mantel and covered with frosted glass. Two mercury switches and the brightness selector control the basic room lighting. One switch services the floor outlets, and the second is the master switch for the dimming unit. The brightness selector dial is marked from one to ten.

Self-contained wiring with M.I. cable

A LOW COST, standard connector tailor-made for mineral-insulated cable permits the fabricating of this cable into a self-contained wiring system. Key parts of the new watertight box fitting are a neoprene gasket and a washer-type grounding ring. The gasket acts as a moisture-proof seal and permits standardization on three connector sizes to fit M.I. cable diameters from .309 to .730 inch. The grounding ring insures a grounding path around the gasket from the raceway to the fitting's metallic body. Fittings illustrated are being produced by Thomas and Betts Co., of Elizabeth, N. J.



The watertight box connector for mineral-insulated cable is installed and ready for use.

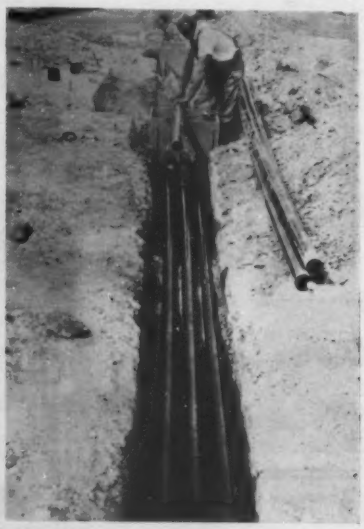
Principal function of the new connector is to provide a watertight termination for M.I. cable. This is accomplished at the switch or junction box by the fitting's tapered hub threads, while the gasket keeps out moisture where connector and cable are joined together. By protecting the cable's screw-on pot from physical damage the fitting hub performs an additional service; the pot is fastened to each M.I. cable end and contains a tightly-packed plastic compound which seals out moisture and combustible gases from the magnesium oxide insulation inside the raceway.

M.I. cable is a self-contained wiring system consisting of one to seven solid conductors, spaced and insulated by an inert mineral material, magnesium oxide, and encased in a seamless metallic sheath. It is said to withstand high temperatures and to be water and gas tight, free from condensation, corrosion resistant and compact. Because of these features and the fact that it provides a grounded electrical system, M.I. cable is used in such places as chemical plants, public utilities, refrigerated areas, breweries, ships and steel mills.

M.I. cable is terminated by cutting it to the desired length. Next, the connector's gland is loosened and the cable is slipped through it. This bends back the fitting's three grounding prongs automatically grounding it to the metallic cable sheath. The sheath then is cut back several inches to expose the conductor and the magnesia filler is scraped off. After the pot is threaded over the end of the sheath and is filled with plastic compound, it is capped with a crimped disc. Lastly, the connector slides over the pot and the gland nut is tightened to complete the joint.

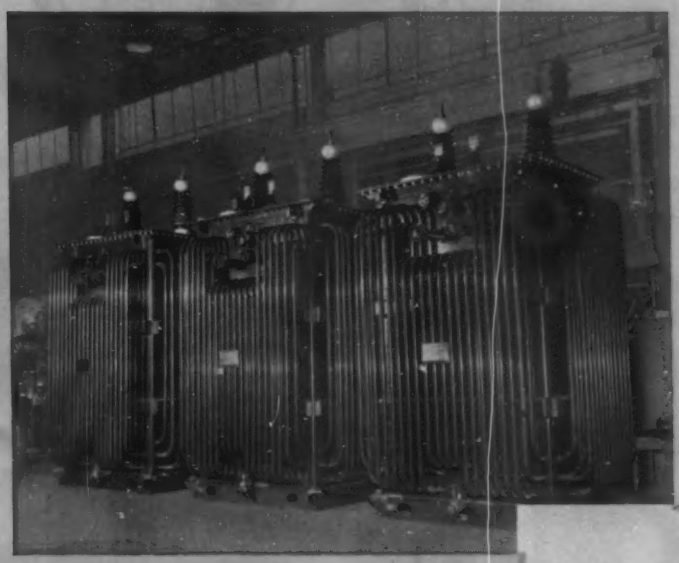
Plastic pipe meets corrosive soil need

AN UNDERGROUND cable conduit installation at Pecos, Texas, which had to meet the requirements of withstanding the strong alkali soil and being easy and convenient to



KUHLMAN—the first nationally known transformer manufacturer with a plant in the South . . . to serve the South!

Established in 1952 to manufacture transformers in the South — for the industrial needs of the South — Kuhlman's Southern Division at Crystal Springs, Mississippi, is located close to the center of the great Southern market. With offices and warehouses in principal cities throughout the South, Kuhlman is well situated to serve Southern utilities and industry.



This big, modern plant of Kuhlman Electric Company at Crystal Springs is completely equipped to build dependable transformers that will provide a steady source of power for Southern utility and industrial customers. From here, transformers can be shipped directly to any part of the South.

These three 2500-KVA, Single Phase, 69000-volt primary Kuhlman Power Transformers were built at Kuhlman's Southern factory. Kuhlman also builds Distribution, Dry Type, Subway, Saf-T-Kuhl, CSP and Series Street Lighting Transformers. For complete information, write today.

KUHLMAN

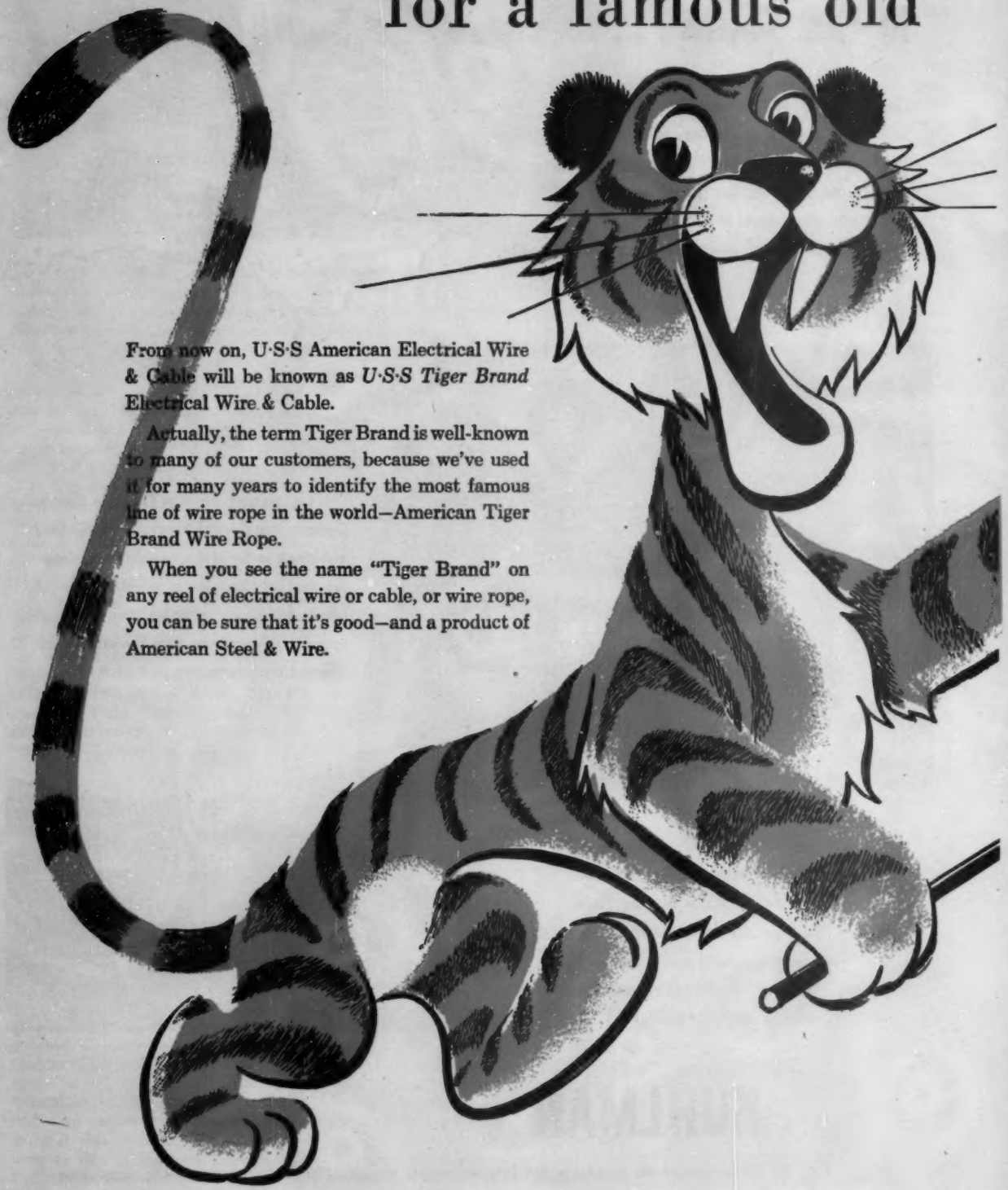
150

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

a brand new name for a famous old



From now on, U·S·S American Electrical Wire & Cable will be known as *U·S·S Tiger Brand* Electrical Wire & Cable.

Actually, the term Tiger Brand is well-known to many of our customers, because we've used it for many years to identify the most famous line of wire rope in the world—American Tiger Brand Wire Rope.

When you see the name "Tiger Brand" on any reel of electrical wire or cable, or wire rope, you can be sure that it's good—and a product of American Steel & Wire.

line of wire and cable

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

handle, has recently been accomplished with the use of butyrate plastic pipe. Twenty-foot lengths of 4-inch pipe, weighing only 20 pounds each, were deposited at the site.

The pipes were joined by solvent welded fittings, and when buried, will remain unaffected by the corrosive soil indefinitely.

The pipe is manufactured by the Mills Plastic Pipe Division of Continental Can Company, and handled through the company's New York sales office.

Industrial type scaffolding reduces maintenance hazards

by E. J. Clary

THE HIGH ACCIDENT rate involved in electrical work has resulted largely from a tendency of the men to be careless and utilizing makeshift apparatus for "getting at" points. That is, using unsuitable or wobbly ladders, makeshift scaffolding, "packing case and plank style," and so on.

Proper quality of maintenance property in any plant (as against maintenance of machinery and equipment) will find the chief accident hazards result in routine work.

Many industrial plants have recognized these facts and have greatly reduced maintenance hazards by the adoption of improved equipment. Some of these are Beech Borrom Power Co., W. Va., Jacksonville Terminal Co., New Orleans Public Service.

Consider the facts which reveal the seriousness of accidents in plant maintenance alone, where so often makeshift, insecure, or improperly adjusted and used scaffoldings are commonly relied upon.

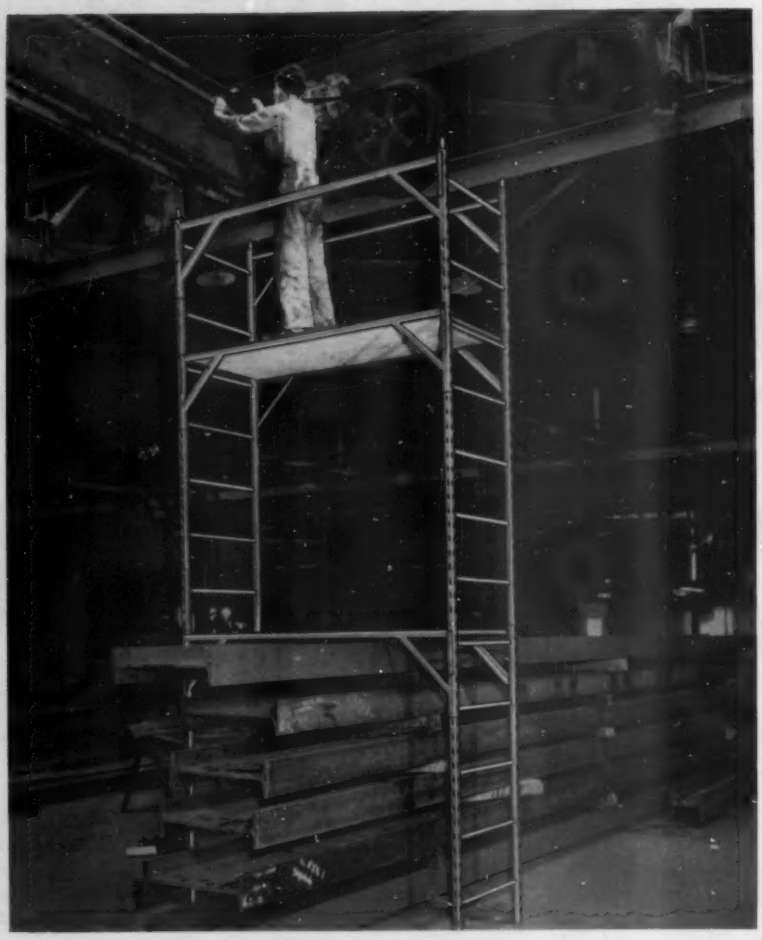
Out of every 100 building maintenance accidents in the industry, 75 are the direct result of makeshift scaffolding, or scaffolding that fails to protect the maintenance worker—often in spite of carefulness. The balance are due primarily to carelessness on the part of the worker.

Beside the safety factor, and the effects of this accident rate in the plant safety program, management must also consider this scaffolding problem from the standpoint of cost. Not only do maintenance and installation accidents result in time loss but inadequate rules and methods governing the property maintenance program slow up the work and increase its cost. Much of this increased cost is the result of using makeshift apparatus in "getting at" maintenance points, according to safety engineers, who also say that the matter of proper interior scaffolding has been much neglected both by supervisors and even by employers themselves.

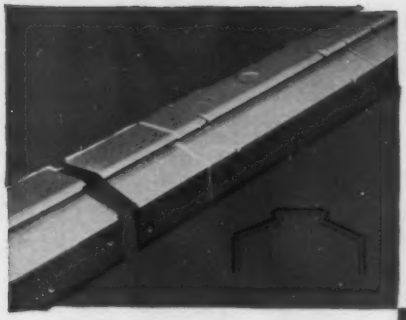
Management is well aware of the steadily rising costs, due largely to the size of modern buildings, better construction, modern touches that need more care, and the rising cost of labor. The matter of modern lighting alone (especially fluorescent lighting) makes great inroads on the maintenance budget although the result in better lighting largely offsets this rise.

Since the apparatus used to "get at" points is the key factor in a safety program, the ability of the newest types of scaffolding are worth study, not only because of their contribution to safety, but also because of their efficiency features which quicken the job, save on its cost and which also enable the worker to do better work.

Perhaps the outstanding step in this direction is represented in a scaffolding design which it is claimed is:



This scaffolding without diagonal braces makes it possible to work safely without disturbing stockpiles or smaller items of equipment.



LOCKED IN PERFECT ALIGNMENT

Uni-Race sections slide into a firm telescopic union with coupler forming a rigid channel that will not distort (even before screws are added) and assures perfect fixture alignment.

THE NEW

ortho-77

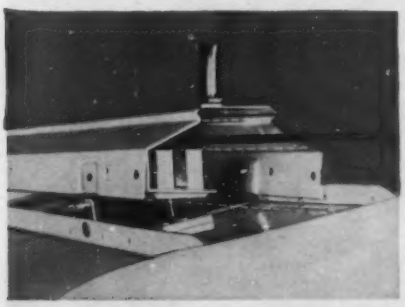
Reg. U. S. Pat. Off. Applied For

WITH UNI-RACE

Acclaimed by lighting experts everywhere as "ushering in a new era in fluorescent fixture design"; the spectacular new Ortho-77 by Gibson is an entirely new concept of fixture design. Incorporated for the first time on any fluorescent fixture are a multitude of features that simplify installation, provide position alignment and spacing and give greater fixture rigidity. Now without tools and in a matter of minutes you can change fixtures instead of ballasts . . . raise lighting levels from two to four light or vary the levels as conditions demand . . . install fixtures at intervals automatically spaced and fill in quickly and easily as needed. Contractors have claimed as much as 50% saving in installation time with the Ortho-77 which means that you, the user, can install this revolutionary fixture incorporating the new Uni-Race, "V" type integrated construction, simplified plug-in wiring and many other features at no greater cost than a conventional installation. See it at your jobber today or write for bulletin Ort-101 for complete information.

RIGID CHANNEL ANCHOR

Light in weight, readily accessible and easily mounted, the Uni-Race provides a rigid channel anchor for all Ortho-77 models. Being machined to exceptional tolerances, it automatically provides for exact fixture spacing.



PLUG-IN SOCKET

Ortho-77 units are wired to a Plug-In Socket which makes contact with a receptacle in the Uni-Race when fixture is closed. Fixture becomes completely dead when open, and being wired in parallel circuits, does not disturb other fixtures when removed.

GIBSON *Manufacturing Co.*

1919 Piedmont Circle, N.E. **Atlanta, Georgia**

(a) Faster to set up
(b) More compact for storage
(c) Safer
(d) Bringing men nearer working level—for efficiency

"In designing the modern type of scaffolding, *safety* was the primary objective," says David Baker, of the Baker-Roos, Inc., engineering staff who worked out the principles involved.

"The primary feature is the self-locking trusses which are the heart of the construction. These truss locks are equipped with safety lugs which lock into slots in ladder sections, giving added security. With platform support trusses therefore cannot be sprung loose even if the scaffolding be tilted or rocked. This feature also insures that the scaffolding platform will be always level which is an added safety factor in certain jobs.

"These platforms are adjustable every three inches. This means added ease, speed, safety and economy of labor," said Baker, "and is especially important when the off-floor maintenance people are working on a staggered or uneven floor surface; for instance, over a stairway.

"Then, there are no X-braces. This means you can use these units anywhere without moving desks or furniture or machinery or other set equipment or facilities. For instance, ceilings may be cleaned over stock piles or furniture and installed machinery—with a minimum of disturbance.

"The working platform is large enough to do any job required being 2'4" x 5'11". Scaffolding units come in 5 parts for assembly: (a) ladders, (b) platform support trusses, and (c) platform which is of metal bound plywood. Loose parts have been eliminated (such as bolts and nuts). Upright ladder sections are a part of each scaffold and are used at each end. Platform support trusses are also interchangeable, and the platform will support up to 800 pounds in all positions."

Larger platform areas are supplied where the management prefers them. Casters make the scaffolding flexible in use and give a valuable mobility. The casters are double locked, once in the swivel and again at the wheel which makes them always steady and safe.

The new type scaffolds can be easily built up, unit for unit, to reach high places. Each unit locks to the other, providing a safe, sturdy scaffold on which several men may work at the same time . . . men may also work at different levels of the stack or scaffolds. After assembling the first unit, placing of the following units is simple. With slotted ends of the ladder sections on the outside, and with dowel ends upward, subsequent ladder sections are placed over the dowels in the top of the assembled ladder sections. Platform support trusses should be assembled so that they overlap the joints of the two ladder sections.

When stacking three units high or more, additional stacks of scaffolds are needed. Stacks are tied together with tying trusses. For work that requires a large working area such as painting, plastering and wall washing the new scaffolds may be assembled side by side, and units up to 10 foot in length are available.

All units are jig-tested for the fit of parts which means added safety. Paint bucket holders are also supplied where wanted.

New Orleans group names '54 committees

PRESIDENT GEORGE F. SINS of the Electrical Association of New Orleans, Inc., has announced the following committee appointments for 1954.

Planning Committee: W. A. Barnes, chairman; E. N. Avegno, vice-chairman; J. N. Roos and Charles Pearson, Jr.

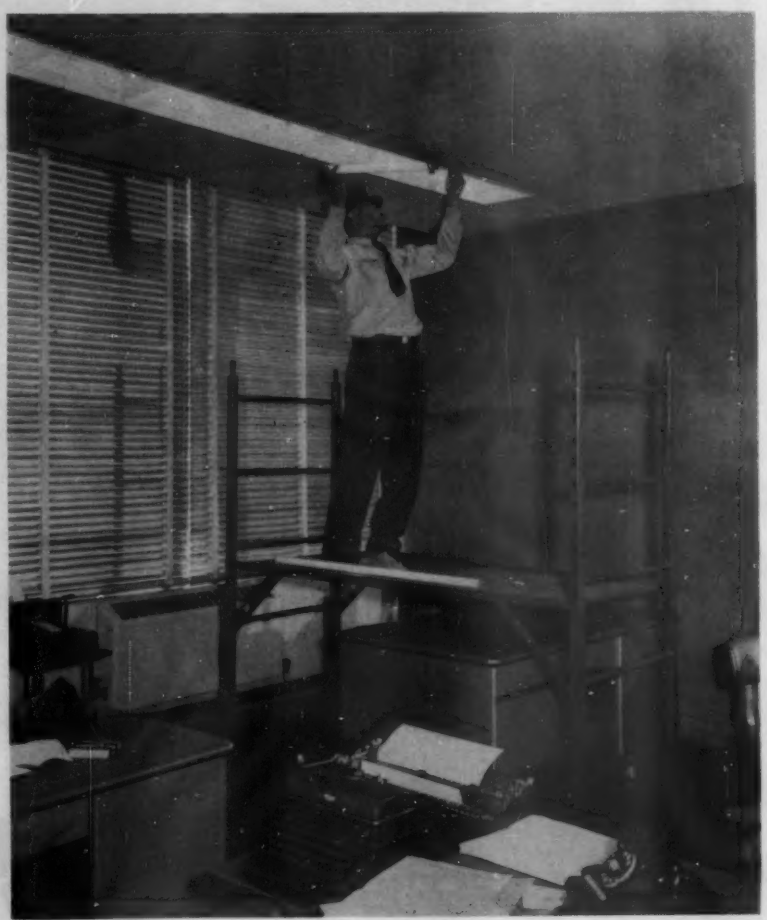
Adequate Wiring Committee: A. G. Siegel, chairman; E. J. Hemard, vice-chairman; E. H. Mowen, secretary; S. A. Greco, I. Blanchard, R. Schumert and George Segal.

Membership Committee: W. H. Bramblett, chairman; C. Espy Reed, vice-chairman and Emmett A. Smith.

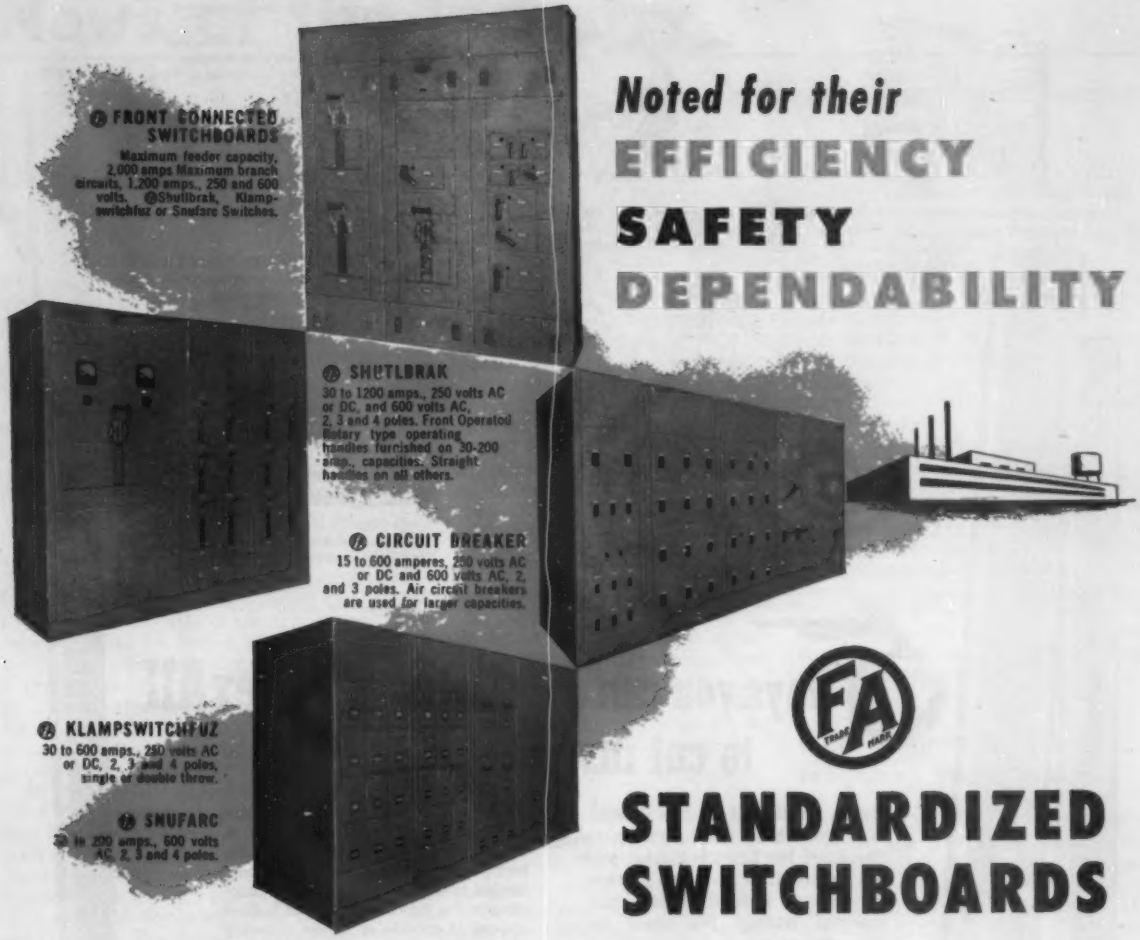
Special Activities Committee: A. B. Paterson, Jr., chairman; T. C. Lauck and Frank Prattini.

Publicity Committee: W. E. Clement, chairman.

Pioneer Committee: W. E. Clement, chairman; S. J. Stewart, Arthur Levy, Edward P. Phillips and Fred Perrin.



Lamp replacement facilitated by use of a scaffold designed to clear desks.


FRONT CONNECTED SWITCHBOARDS
Maximum feeder capacity, 2,000 amps Maximum branch circuits, 1,200 amps., 250 and 600 volts. @Shutlbrak, Klampswitchfuz or Snufarc Switches.
SHUTLBRAK
30 to 1200 amps., 250 volts AC or DC, and 600 volts AC, 2, 3 and 4 poles. Front Operated Rotary type operating handles furnished on 30-200 amps., capacities. Straight handles on all others.
CIRCUIT BREAKER
15 to 600 amperes, 250 volts AC or DC and 600 volts AC, 2, and 3 poles. Air circuit breakers are used for larger capacities.
KLAMPSWITCHFUZ
30 to 600 amps., 250 volts AC or DC, 2, 3 and 4 poles, single or double throw.
SNUFARC
30 to 200 amps., 600 volts AC, 2, 3 and 4 poles.

Noted for their
EFFICIENCY
SAFETY
DEPENDABILITY

STANDARDIZED SWITCHBOARDS

Built of standardized pre-assembled units, incorporated in standardized enclosures, **Standardized Ⓕ Switchboards** embody the latest features in design and operation to assure maximum safety, efficiency and dependability. **Standardized Ⓕ Switchboards** are of three main types — the **Shutlbrak,** a safety type switchboard designed for frequent operating use, the **Klampswitchfuz and Snufarc,** which feature a dependable hinged-type, pull-out switch unit for disconnect service on lighting and power circuits, and the **Circuit Breaker**, another safety type, featuring the latest developments in automatic circuit protection. For use where space is limited, front connected switchboards are also available.

All **Standardized Ⓕ Switchboards** are factory-assembled including bus bars, and are shipped ready for connection of main and branch circuit cables. Units can be arranged singly or grouped, because all sections fit together readily. Removable end walls permit the addition of sections on either side.

Want to know more about these sturdy, long lasting and trouble-free switchboards? Your nearest Ⓕ representative, listed in Sweet's, will be glad to give you complete information.

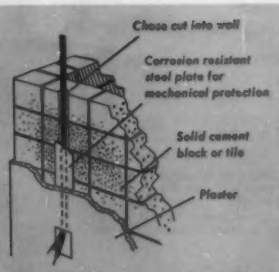
Frank Adam Electric Co.

BOX 357, MAIN P. O.
ST. LOUIS, MISSOURI

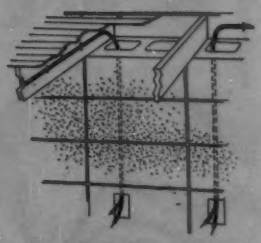
Makers of: BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

1 For locations destructive to conventional cables, Rome FlexAll is safe, non-rotting and flame resistant.

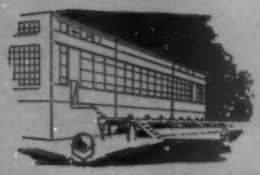
2 Buried direct in earth, Rome FlexAll is ideal for wiring between buildings.



3 Embedded in plaster, Rome FlexAll makes for neater appearance in the rewiring of old buildings.



4 Rome FlexAll is easy to work within hollow spaces of masonry block or tile walls.



5 Rome FlexAll is ideally suited for the underground wiring of floodlight installations.

Two and three conductor Rome FlexAll is manufactured in sizes 14 AWG through 10 AWG. Standard color is pearl gray, put up in 250' cartons. Two conductor construction is available with or without ground wire. Underwriters' approved as Type UF and Type NMC—600 volts.

5 ways you can use new Rome FlexAll to cut installation costs

Rome FlexAll is a new single, two, and three conductor cable designed for branch circuit and feeder services. It is the answer to low cost industrial and commercial wiring. It's ideal for amusement areas, outlying farm buildings and residences.

Rome FlexAll, single conductor, is approved by Underwriters' Laboratories, Inc., as Type UF (Underground Feeder). The two and three conductor constructions are approved as, both, Type UF and Type NMC (Non-metallic Sheathed Cable—Corrosion Resistant). Such dual approval makes Rome FlexAll the inventory-saving choice for branch and feeder circuit work.

Rome FlexAll is recognized by the National Electrical Code for 1953 for the following types of installation:

Single Conductor • For branch or feeder circuits *buried directly in earth* when provided with over-current protection.

Multiple Conductor • For branch or feeder circuits *buried directly in earth* as indicated above • For interior wiring, either exposed or concealed in dry, wet or corrosive locations • For installation within hollow spaces of outside or inside masonry block or tile walls • For embedding in plaster or shallow chase in masonry, when suitably protected.

Rome FlexAll, single conductor, has an integrally applied all-resistant Rome Synthinol, Type TW, thermoplastic insulation and sheath. Rome FlexAll, two and three conductor, is insulated with the same high quality compound, with individual conductors covered with an inorganic glass yarn wrap. Over the assembled conductors is an abrasion, rot, moisture and flame resistant Rome Synthinol thermoplastic sheath.

For *direct burial in earth or the hazards of wet and corrosive conditions . . . ask for Rome FlexAll.*

. . . It Costs Less to Buy the Best

Rome FlexAll, single conductor, is manufactured in sizes 14 AWG through 4 AWG. Standard color is black, put up in 500' cartons. Underwriters' approved as Type UF—600 volts.

ROME CABLE
Corporation
ROME : NEW YORK
and
TORRANCE : CALIFORNIA

News of the industry

edited for Southern readers

REA plans new program for farm electric use

REA PROPOSES to pump new life into program to help farmers make more and better use of electric power.

Administrator Ancher Nelsen recently held a conference of electrical equipment manufacturers and rural electrification leaders in Chicago, in order to get a united effort behind the program. Representatives of the National Rural Electric Cooperative Association and all statewide organizations of REA borrowers were invited to attend.

"Good use of electricity along REA-financed lines is one of the best hopes of REA electric cooperatives to remain a strong and vital force in American agriculture," Administrator Nelsen said in calling the conference. "Similarily, its good use by our farmers is one of their best hopes to improve farm efficiency."

In his letter of invitation, the REA administrator said: "While much work has been done to encourage the greater farm use of electrical equipment, it is our feeling that the surface has been barely scratched. It seems to us that if we can give the industry representatives an accurate picture of the great potentialities in the rural market, we can win their active assistance in the important job of expanding the power use program."

Shortly after taking office in April, 1953, Mr. Nelsen said he considered a program to help farmers make more efficient use of electricity one of the important purposes of his administration. The Chicago meeting, he said, is a step in his program.

REA is a lending agency of the United States Department of Agriculture. It makes loans for the extension of electricity to persons in rural areas who are without central station electric service. The loans bear two per cent interest and are amortized over a period of not less than 35 years. Part of each consumer's monthly payment for electricity goes to pay off the government loan. REA acts mainly as a banker.

On January 1, 1954, REA had loaned $2,778,000,000 to 1,078 borrowers. This includes 983 cooperatives, 44 public power districts, 26 other public bodies and 25 commercial power companies. On that date, these borrowers were operating 1,295,000 miles of line serving 4,031,000 consumers in 2,600 counties in 46 states, Alaska, Puerto Rico and the Virgin Islands. About 2,600,000 of the REA-financed consumers are farms. They also include non-farm dwellings, schools, churches, stores, community buildings, new rural industries and other commercial enterprises.

The REA electric borrowers have proved to be good financial risks. As of January 1, 1954, they had paid approximately $163,300,000 in interest, and had repaid $305,200,000 in principal on their electric loans. This includes a current balance of more than $62,500,000 of payments made by borrowers ahead of schedule which may be applied against future interest or principal installments. Only $343,000 was delinquent as of the beginning of this year.

REA also makes loans for the extension and improvement of telephone service in rural areas.

Anaconda ads feature adequate wiring needs

ANACONDA COPPER Mining Company is currently conducting an institutional advertising series, emphasizing the out-dated wiring problem currently plaguing a good part of the nation. The series is titled, "Look What's Happening in Metals," and ads will appear in the *Saturday Evening Post, Time, U. S. News and World Report* and *Business Week*.

A feature of the advertisement is a picture showing a "couple in a quandary," Mr. and Mrs. Newly Married, surrounded by most of the good things in household appliances that money can buy today, but not quite sure their home is wired to power all of them.

Aimed at convincing consumers of their needs in re-wiring, the ad backs up Anaconda Wire & Cable Company's Full Power Ahead and Power Up campaigns being waged in behalf of the entire electrical industry, with promotional help for contractors, distributors and utility companies.

NLB committee plans relighting promotion

GENERALLY FAVORABLE reactions greeted the National Lighting Bureau's relighting promotion program, when it was presented to an all-industry board of advisors, at a meeting of the executive commit-

The Anaconda ad features this picture showing Mr. and Mrs. Newly Married, surrounded by most of the good things in household appliances that money can buy today, but not quite sure their home is wired to power all of them.

NEW PLANT—This is the new quarters of the Electrical Equipment Co., 1441 Greene St., Augusta, Ga. The firm handles sales and service on motors, controls, transformers and generators, and also maintains branches at Richmond, Va., Raleigh, N. C., and Laurinburg, N. C. T. R. Duncan is manager of the Augusta branch and F. E. Cook is assistant manager.

tee of that organization, in New York City recently.

This program has been in formation by a committee of the Industrial and Commercial Lighting Equipment Section, NEMA, for the last year-and-a-half. The need for such development was pointed up in a 1950 survey which showed that at least 85 per cent of industrial and commercial properties are not lighted to provide optimum operating conditions. Under the program, both sales activity and buyer receptiveness will be promoted.

The members of the 16-man advisory board of the National Lighting Bureau has been appointed by EEI, IAEL, IES, NAED, NECA and the major lamp companies to help coordinate the activity. They bring to the program the benefits of the thinking of each of the major segments of the electrical industry.

Meeting with the Executive Committee of the National Lighting Bureau, 13 advisors and three guests put their stamp of approval on the program and offered constructive criticisms. As an evidence of their interest, they offered to peruse and criticise all program material before it is printed. E. C. Huerkamp, Westinghouse Lighting Division, chairman of the executive committee, National Lighting Bureau, presided.

Committee members and the director of the bureau reported at the meeting on the progress of the program. The technical and legal details of certification have been cleared. The original manuscripts of the technical education course chapters — each prepared by a leading authority in the field—are being checked by members of the responsible subcommittee. At the same time, these chapters are being rewritten by the training agency retained for this operation.

The same agency is preparing the sales training course, and its researchers, along with the Director of the Bureau, have visited contractors and utility commercial managers and their staffs in some twelve cities.

The time-table, set up at the meeting, calls for presentation of details of the program to industry groups in potential pilot cities in April. The presentations will be buttressed with portions of the program in printed form, supplemented by the rest of the material in draft or dummy form.

Pilot runs will be made in one large, one medium and one small city. Following their selection, the industry groups in these cities will be aided in the organizing of their respective local programs and the setting-up of their local lighting bureau. Each pilot city will be ready to commence its training classes, certification and promotion in September.

"I'm warning you, Larson, if I come up there and find you reading old comic books instead of running in conduit. . . ."

NECA Carolinas' officers named

AT THE ASSOCIATION'S annual meeting held in Charlotte on February 17, John Seabrook of Charleston, S. C., was elected president of the Carolinas Chapter of the National Electrical Contractors Association.

Other new officers also elected are: Joe E. Cooper, Greensboro, N. C., first vice-president; Marshall Walker, Rock Hill, S. C., second vice-president; W. W. Hanks of Charlotte, secretary; Ralph K. Robinson, Charlotte, governor; John C. Bolen, Charlotte, treasurer; and G. W. Graves, Wilmington, N. C., national councilor.

Named on the executive committee were: W. C. McGregor, Anderson, S. C.; Joe Dunn, Columbia, S. C.; Ralph Pressley, Asheville, N. C.; Charles W. Moseley, Charlotte, J. R. Siebert, Salisbury, N. C.; Howard Pancoast, High Point, N. C.; Elwood Peele, Burlington, N. C.; and B. J. Colter, Winston-Salem, N. C.

Dwight L. Casey, Charlotte, is chapter manager and headquarters are maintained in Charlotte.

Southern Regional IES Technical Conference set

ANNOUNCEMENT has been made by S. C. Berdon, conference chairman, New Orleans Section, that the Southern Regional Technical Conference of the Illuminating Engineering Society will be held at the Roosevelt Hotel, New Orleans, La., on April 8 and 9.

One of the highlights of this conference is to be the presentation of papers in the organization's "My Most Interesting Lighting Job" contest. Further details of the conference will be announced at a later date.

Graybar opens branch at Springfield, Mo.

GRAYBAR ELECTRIC Company has opened a new and completely modern branch at 524 East St. Louis St., Springfield, Mo., W. Frazier, Midwestern district manager, has announced.

The branch will handle the full line of Hotpoint major appliances and a complete line of traffic appliances, and will stock locally the electrical supplies needed by utilities, municipalities, REA Co-ops, telephone companies, electrical contractors and industrials.

R. L. Shuck has been appointed manager of the new branch, after covering part of the Kansas City territory as a salesman for 15

Test after Test

has proved the PENN-TAP'S

Unequalled Strength

No other fitting of this type has matched the Penn-Tap in tensile strength, in numerous tests to destruction. The reason is obvious:

The Penn-Tap is more sturdily constructed . . . exceptionally tough silicon bronze alloy and ***more of it*** (at no added cost).

For taps, service entrance connections, dead ends . . . indoor or out. Quickly installed with ordinary wrench.

ONE PIECE—no loose parts . . . swivels on one locked bolt. Holds tight permanently. 7 sizes, for cables 10 Str. to 1,000 MCM.

Only one other Split Bolt Connector can take as high clamping pressures as PENN-UNION

Hundreds of competitive torque tests, of Penn-Union Split Bolt Connectors against other fittings of this type, have shown:

The Penn-Union Connector is *definitely stronger than all others except one, which closely follows Penn-Union design and is nearly equal.*

Excepting this one similar fitting, the Penn-Union Connector withstands clamping pressures 15% to 55% higher.

MAKE THESE TESTS YOURSELF. We will gladly furnish sample Penn-Union Connectors for tests against any other make. ***Just tell us the sizes you are using.***

Sold by leading wholesalers. Warehouse stocks carried by—

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Gulf Sales Agency, 731 Wingfield St.
Jackson, Miss.

WALTER J. HUEMMER
Dallas Transfer & Term.
Warehouse Bldg., Dallas, Texas

WILLIAM ROBINSON
Gulf Sales Agency, 524 East 14th St.
Little Rock, Arkansas

PENN-UNION ELECTRIC CORPORATION, Erie, Pa.

PENN-UNION

years. A native of McDonald, Kansas, he was commercial manager of the Springfield, Mo., Gas and Electric Co., before joining Graybar.

Day-Brite executive addresses Georgia IES

FEATURED SPEAKER at the regular monthly meeting of the Georgia Section, Illuminating Engineering Society, was James F. Whitehead, Jr., vice-president in charge of sales, Day-Brite Lighting, Inc., St. Louis. Mr. Whitehead, a native Georgian, addressed the group of 86 members and guests on "Troffer Lighting."

Chairman Johnnie E. Sweatte presided at the meeting and the speaker was introduced by Oren Ruff. Mr. Whitehead, who was instrumental in organizing the Atlanta Lighting Club, forerunner of the Georgia IES Section, when he was in Atlanta with the Georgia Power Company, is currently a director of the IES.

"Some words may fool you. Light may mean just a bare bulb on a cord, or it may mean a match to light your cigarette. 'Trunk' may mean a part of an animal, or a storage chest—but 'Good illumination' always means quantity, quality, and comfort," Mr. Whitehead told the group. His illustrated talk on recessed lighting equipment, appraised the cost and comfort values of 13 different systems, as shown in the chart accompanying this article.

In studying the accompanying chart, it is important to note that items marked with the numeral (1) include only material (branch circuits, fixtures, lamps) and not installation. Numeral (2) items include only the cost of ceiling and installation of materials. Numeral (3) items denote the square foot cost of items marked (1) plus (2). It should also be noted that the Grid Type Mobilex referred to in the chart is designed for installation with Owens-Corning Fiberglas Ceiling Board.

James F. Whitehead

Cost and comfort data on various types of recessed troffer lighting

ROOM SIZE 40'x60'x10' 50 F.C.	RECESSED TROFFERS, 12"x48"							RECESSED "MOBILEX", 24"x48"					
	3-40W. GLASS	3-40W. LOUVER	2-40W. L. & LENS	3-40W. LOUVER	2-75W. LOUVER	2-40W. ALUM.	1-40W. ALUM.	T-17 ALUM.	2-40W. GLASS	3-40W. GLASS	2-40W. LOUVER	2-40W. PLASTIC	2-40W. LENS
BRIGHTNESS, Cross & Long.	1.0 1.8	1.5 1.3	1.2 1.7	2.3 2.2	1.5 1.3	0.2 1.5	0.4 0.8	0.1 1.5	0.5 1.1	0.8 1.2	0.8 1.2	1.3 1.6	0.5 0.4
COEF. OF UTILIZATION	.52	.49	.51	.43	.49	.50	.58	.61	.60	.57	.59	.57	.56
NUMBER OF UNITS	70	72	71	56	35	71	120	120	60	42	61	62	64
FIRST COST, LIGHTING (1)	$2330.00	$2397.00	$2857.00	$2131.00	$2292.00	$2825.00	$3333.00	$3935.00	$2452.00	$2202.00	$2493.00	$3212.00	$3616.00
INSTALLATION–PLASTER (2)	2092.00	2111.00	2102.00	1952.00	2016.00	2102.00	2591.00	2598.00	x	x	x	x	x
INSTALLATION–METAL (2)	2795.00	2809.00	2802.00	2718.00	2722.00	2802.00	3082.00	3088.00	x	x	x	x	x
INSTALLATION–FIBER (2)	x	x	x	x	x	x	x	x	1892.00	1770.00	1913.00	1953.00	1980.00
COST/SQ. FT.–PLASTER (3)	$1.84	$1.88	$2.07	$1.70	$1.79	$2.05	$2.47	$2.72	x	x	x	x	x
COST/SQ. FT.–METAL (3)	2.13	2.17	2.36	2.02	2.09	2.34	2.67	2.92	x	x	x	x	x
COST/SQ. FT.–FIBER (3)	x	x	x	x	x	x	x	x	$1.81	$1.65	$1.83	$2.15	$2.25
COMFORT–CROSSWISE	30	45	20	70	45	5	5	5	20	40	30	80	20
COMFORT–ENDWISE	40	50	25	80	50	25	15	25	30	55	35	80	20

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PARAFLEX Non-Metallic Sheathed Cable lays flat. Won't squirm or twist. Clean to handle. Plainly marked.

PARAUSE® Type "RR" cable provides permanent underground installation from power line to meter and for connecting several buildings. CAA approved under Specification L824.

HYDRO-THERM® Building Wire combines in a single wire the heat-resistant qualities of Type RH and the moisture resistant qualities of Type RW.

URC Weatherproof Wire and Cable can be relied upon to meet severe climatic conditions. Both actual line and Weather-Ometer tests prove unusual ageing characteristics.

SERVICE ENTRANCE CABLE, Type SE Style U unarmoured and Type SE Style A armoured. There is also a Paranite Service Drop Cable, two conductor, Type SD.

DREADNAUGHT® Heavy Duty Cable has lead-cured neoprene insulation. Flexible, durable, safe, long-lived. Cuts repairs and replacements. Delivers current continuously.

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Georgia IES Section sponsors joint meeting

SOME ONE HUNDRED and fifty persons attended the joint dinner-meeting of the Georgia Section Illuminating Engineering Society, and the Atlanta Residence Lighting Forum, held in Atlanta recently. Presiding at this session was J. E. Sweatte, Atlanta division lighting engineer, Georgia Power Co., and chairman of the Georgia Section, IES.

J. D. Poage, program chairman, presented the speaker of the evening, James A. Meecham, industrial sales engineer, Sherwin-Williams Co., Cleveland, Ohio. Mr. Meecham is an outstanding member of IES and a well known color consultant.

"Color in Relation to Lighting" was the subject of the illustrated talk given by Mr. Meecham. He demonstrated that light has an important effect in determining the way a color will appear, the extent to which the color used determines the intensity of illumination, and the importance of brightness ratios as a factor in glare and illumination.

Mr. Meecham advised his audience to check the light source before selecting colors from a color chart in a paint store. "Gray might look pink when you get it home," he added. He then explained that the fluorescent light in the store and the incandescent illumination at home causes the difference. "Intense colors create a big blast at first, but they are not as easy to live with as pastels," stated Mr. Meecham. A number of other interesting facts about color and color harmony were also demonstrated.

These men participated in the program of the recent joint meeting of the Georgia Section Illuminating Engineering Society and the Atlanta Residence Lighting Forum. From left to right, they are: James A. Meecham, industrial sales engineer, Sherwin-Williams Co., Cleveland, Ohio; J. E. Sweatte, Atlanta division lighting engineer, Georgia Power Co., and chairman of the Georgia Section, IES; James D. Poage, central station lighting specialist, Westinghouse; and William B. Bell, Southeastern regional director, Sherwin-Williams.

Bryant Electric announces sales personnel changes

BRYANT ELECTRIC CO., Bridgeport, Conn., has announced the combining of the sales activities of the Wiring Device and Hemco Plastics Divisions under Harold Hey, general sales manager.

Clyde W. Foster has been appointed specialties sales manager for all plastic products and will direct certain wiring device activities. Mr. Foster has been with the company 34 years in various sales capacities, and since 1946 was Western district manager. He will be located at Bridgeport.

John R. Craig succeeds Mr. Foster as Western district manager, Chicago. Mr. Craig joined the company in 1929 and for the past two years has been North Central area manager with headquarters at Cincinnati.

Edgar B. Gilmore, has been appointed North Central area manager, succeeding Mr. Craig.

Robert S. Hawkins, has been appointed Southwestern area manager with headquarters at Dallas, Texas.

Both Mr. Gilmore and Mr. Hawkins have been field representatives for a number of years in the respective areas prior to their appointment.

Clyde W. Foster

John R. Craig

Edgar B. Gilmore

Booklet on commercial kitchen wiring announced

FOR ARCHITECTS, food service equipment dealers, designers and consultants, and food service operators themselves — a new "blueprint" in booklet form on commercial electric kitchens is now available.

The title—"Adequate Wiring for Complete Commercial Electric Kitchens"—is fully descriptive of its contents. Anyone interested in designing or planning kitchens for electric commercial cooking will find much factual and helpful information in this new booklet. It is of particular value to those thinking of attractive "open kitchen" designs, which have such great customer appeal today.

As this booket points out, the time to assure adequate wiring for commercial cooking equipment is at the planning stage, before the plans are drawn and before the kitchen is built or remodeled.

The booklet explains how to figure wiring requirements, and outlines the benefits of an all-electric commercial kitchen operation. It also includes the complete plan of a typical all-electric commercial kitchen, accompanied by a wiring diagram showing electric connections for this kitchen.

Also included are the minimum wattages required for various makes and models of commercial electric cooking equipment, and a

NEW ORLEANS BUILDER REPORTS...

Robert D. Gibbens, President
Associated Builders, Inc., New Orleans, Louisiana

"FASCO VENTILATING FANS SELL MY HOMES QUICKER!"

"All my homes have Fasco kitchen ventilating fans because they have proved to be the most efficient and economical way to reduce home air conditioning loads. They have guaranteed the home to be free of kitchen smoke and odors which so often are found in air conditioned homes. Those homes which I do not air condition are equipped with Fasco ventilating fans too. They prove to the prospective housewife that thought and planning have been a part of the kitchen construction. I am also beginning to use Fasco ventilating fans in my baths—they are plus features which sell my homes quicker!"

Robert D. Gibbens

MODEL 885 CEILING VENTILATING FAN

Designed especially for single story construction. Simple to install—mount in ceiling and attach to standard 8" round duct which is extended through the roof. Low cost and high efficiency make the 885 extremely popular. 8" blade, 475 CFM.

Bob Gibbens is typical of progressive builders everywhere in his choice of Fasco Ventilating Fans for his 100 custom homes. Power-plus performance, rugged dependability, ease of installation, and wide choice of models make Fasco America's most popular ventilating fans. Customer-preferred Fasco adds a real sales punch! Every Fasco Ventilating Fan you specify *proves* you build extra quality homes.

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Cavalier®

IS THE

FASTEST SELLING
MOST PROFITABLE

Electric Heater Line

for You!

This *actual sales chart* shows how Cavalier Automatic Electric Heaters are selling in heavy, tremendously increasing volume everywhere—and making big profits for Cavalier dealers and contractors! Many electrical contractors have done *10 times* the volume they expected to do in their first year. The reasons are simple: customers love Cavalier's convenience, beauty, and host of exclusive features. Dealers and contractors appreciate Cavalier's easy-to-install designs and extra-low service costs. Cavalier has a complete line to meet any heating requirements. Order them and you'll prove for yourself that Cavalier is the *fastest moving, most profitable* Automatic Electric Heater line you can sell!

COMPLETE LINE:

WALL INSERT HEATERS
SURFACE MOUNTED HEATERS
PORTABLE HEATERS
FLOOR FURNACES
FULL CHROME FINISH
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Electric Heater Division

CHATTANOOGA 2, TENNESSEE

1950 1951 1952 1953 1954

wiring capacity table. This table is a guide for determining the sizes of circuit wires, switch and fuse sizes, and circuit breaker sizes for individual cooking appliances. It can also be used for calculating feeders to serve batteries of cooking appliances.

Copies of this folder—"Adequate Wiring for Complete Commercial Electric Kitchens"—may be had without charge by addressing the Commercial Cooking Equipment Section of the National Electrical Manufacturers Association at 155 East 44th Street, New York 17, N. Y.

Cope adds Florida to Gearhart territory

T. J. COPE, INC., Philadelphia, Pa., manufacturers of power installation tools and equipment and Cone Expanded Metal Cable Trough announces the appointment of the Jacksonville, Fla., office of the Gearhart Co., Atlanta Ga., as sales representatives in Florida. Gearhart will continue to represent Cope in Georgia, Alabama, and Eastern Tennessee. Gearhart handles the complete line of Cope epuipment.

Monteith nominated new AIEE president

NOMINATION of A. C. Monteith, vice-president in charge of engineering, Westinghouse Electric Corp., Pittsburgh, Pa., as 1954-55 president of the American Institute of Electrical Engineers, was announced recently by H. H. Henline, secretary. The announcement followed a meeting of the Institute nominating committee during the society's Winter General Meeting.

At the same time Mr. Henline announced the nomination of five vice-presidents, three directors and the treasurer.

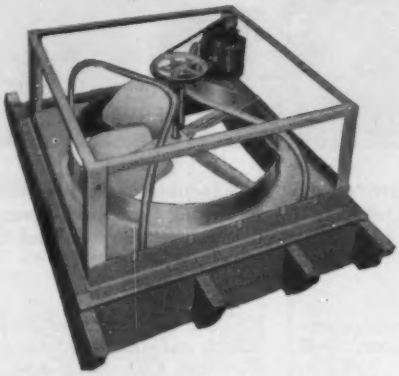
Balloting for the officers will be by mail among the Institute's more than 47,000 members. Results will be announced at the Summer and Pacific General Meeting in Los Angeles in June.

Mr. Monteith has been with Westinghouse since 1923 and has been active in Institute affairs since his student days. He has served as chairman and member of numerous Institute committees and was a director from 1947 until 1951. He also has been chairman of the Pittsburgh Section of the Institute.

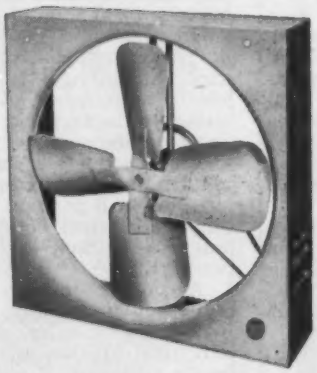
Vice-presidents, who will serve two-year terms, were nominated as follows: G. J. Crowdes, chief engineer, Simplex Wire & Cable Co., Cambridge, Mass.; J. P. Neubauer, division engineer, Consolidated Edison Co., New York; Claude M.

LAU 1954 Fan Facts

Here's the LOW-COST way to add Sales Appeal to every home you build!



LAU "Niteair" Rancher Fans. Available in sizes and air delivery to meet every need. Balanced, free of vibration, built for quiet, trouble-free service.



LAU "Niteair" Panel Units. Residential, commercial and industrial fans adaptable for any practical application in homes, apartments, stores, office and industrial plants.

Today's home buyer wants his new home completely equipped with the latest in modern conveniences. BUT . . . he doesn't want to pay high additional costs for these comforts.

That's why a LAU Fan answers your problem. At a low cost, a LAU "Niteair" Fan offers the home owner the ultimate in cool, refreshing, healthful slumber. During those hot summer months he'll sleep cool as a cucumber in a house that YOU built and SOLD him.

Quick . . . easy . . . economical to "install-when-you-build". The LAU Fan is the quickest way to a prospect's heart and POCKETBOOK. For more sales, more profits, plan to install tested, proven LAU "Niteair" units in your next project!

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Lau fan ratings are Certified by the PFMA and carry UL approval. Fans are guaranteed for 5 years and motors carry a one-year warranty.

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Summers, engineer, Works Laboratory, General Electric Co., Fort Wayne, Ind.; S. M. Sharp, vice-president and chief engineer, Southwestern Gas & Electric Co., Shreveport, La.; and John R. Walker, regional power manager, U. S. Bureau of Reclamation, Billings, Mont.

G-E Supply opens Augusta branch

A NEW 15,000-square foot electrical supplies warehouse, to serve Northeastern Georgia and the Southern part of South Carolina, was opened recently at Augusta, Ga., by the General Electric Supply Company.

The modern building, air-conditioned and furnished with the latest in handling equipment, is the fourth branch office and warehouse to be opened by the G-E Supply Company in Georgia. Dedication ceremonies were attended by city officials, civic leaders, and GESCO employees from Augusta and Atlanta.

Henry E. Lane, GESCO District Manager, Atlanta, said the new warehouse will be the Northeast anchor of a four-cornered distribution network which will greatly improve service to electrical dealers throughout the state. Other locations are Atlanta, Savannah, and Albany.

The new branch will be managed by Sam Bohler, GESCO representative in Augusta for the past four years. It will carry a full line of General Electric and Hotpoint products, including electrical construction supplies, major and small appliances, lamp bulbs, and other electrical products.

Also attending the opening were C. J. Hendon, commercial vice-president, General Electric Co., Atlanta, and R. A. Clark, vice-president and regional manager, G-E Supply Co., Atlanta.

Attending the recent industry meeting on Adequate Wiring in New Orleans, La., was this group of electrical contractors, utility representatives, distributors, and building contractors. H. E. West, Anaconda Wire and Cable Co., was the featured speaker.

Anaconda executive gives talk on adequate wiring

H. E. WEST, special representative of the Anaconda Wire & Cable Co., from Washington, D. C., gave talks at a recent meeting in New Orleans, La., on "Full Power Ahead" and "Power Up and Be Prepared." These are programs sponsored by Anaconda to promote adequate wiring.

The meeting was attended by representatives of Louisiana Power & Light Co., New Orleans Public Service, Inc., National Electrical Contractors Ass'n., Independent Contractors Ass'n. of New Orleans, Electrical Supply Co., Graybar Electric Co., Inc., and Westinghouse Electric Supply Co.

At this meeting, Mr. West pointed out the inability of the appliance industry to sell certain major appliances because of wiring completely incapable of carrying an additional load. His talk referred to recent national magazine articles pinpointing this crisis in the electrical industry. Attention was called to the fact that not only are most residences five years old or more inadequately wired, but also nine out of ten industrial plants are not in a position to add new major electrical equipment without the addition of supplemental wiring.

According to Mr. West, this situation is rapidly reaching a point where sales of additional electrical appliances will be seriously curtailed, if not completely eliminated, unless the American public is immediately apprised of the necessity of expanding and improving existing wiring systems in the home, on the farm, in commercial establishments, and industry.

The General Electric Supply Company warehouse recently opened in Augusta, Ga., will serve northeastern Georgia and southern South Carolina.

Texas Relay Engineers set conference date

THE SEVENTH ANNUAL conference for Protective Relay Engineers has been set for April 26-28, 1954 at the Department of Electrical Engineering, A&M College of Texas, College Station, Texas.

L. M. Haupt, chairman of the conference, has requested that anyone desiring further information concerning this year's conference, write him in care of the college.

Dates Ahead

Southeastern Electric Exchange, General Conference, Boca Raton Hotel and Club, Boca Raton, Fla., Mar. 22-24, 1954.

Southern Homes Show, first annual affair, Textile Hall, Greenville, S. C., Mar. 22-26, 1954.

Oklahoma Utilities Association, Annual Convention, Oklahoma Biltmore Hotel, Oklahoma City, Okla., March 25 and 26, 1954.

Mississippi Chapter, IAEI, annual meeting, April 1-2, 1954. Markham Hotel, Gulfport, Miss.

Tennessee Chapter, IAEI, annual meeting, April 5-6, 1954. Andrew Jackson Hotel, Nashville, Tenn.

Edison Electric Institute, 20th Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill., April 5-8.

Illuminating Engineering Society, Southern Regional Conference, Roosevelt Hotel, New Orleans, La., April 8-9, 1954.

Illuminating Engineering Society, Southwestern Regional Conference, Rice Hotel, Houston, Texas, April 11-13, 1954.

North Carolina Chapter, IAEI, annual meeting, April 13-14, 1954. Carolina Hotel, Raleigh, N. C.

Southern Textile Conference, Georgia Institute of Technology, Atlanta, Ga., Apr. 15-16, 1954.

South Carolina Chapter, IAEI, annual meeting, April 15-16, 1954. Hotel Columbia, Columbia, S. C.

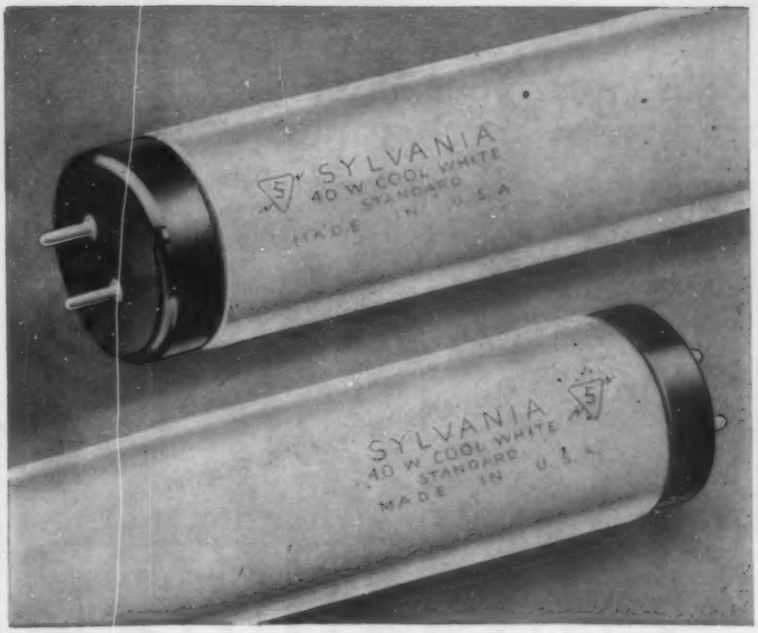
Georgia Chapter, IAEI, annual meeting, April 19-20, 1954, Griffin Hotel, Griffin, Ga.

Alabama Chapter, IAEI, annual meeting, April 22-23, 1954. Thomas Jefferson Hotel, Birmingham, Ala.

7th Annual Conference for Protective Relay Engineers, A & M College of Texas, College Station, Texas, April 26-28, 1954. Conference chairman, L. M. Haupt, c/o A & M College.

Southeastern Electric Exchange, Engineering and Operation Section, Sans Souci Hotel, Miami, Fla., May 6-7, 1954.

(*Continued on page* 72)



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Longer Lasting Brightness

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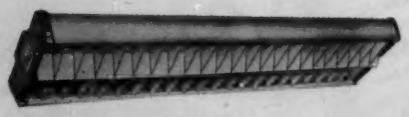

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Dates Ahead

(*Continued from page 71*)

George Welman, North Louisiana-East Texas, Texas and Texas Gulf Coast Chapters, IAEI, annual meeting, May 7-8, 1954. Edson Hotel, Beaumont, Texas.

Nashville Electric Show, third annual, Electric Center Drive-Thru Garage, Church Street at 13th Avenue, Nashville, Tenn., May 11-14, 1954.

Edison Electric Institute, Annual Convention, Atlantic City, N. J., June 1-4, 1954.

National Association of Electrical Distributors, Annual Convention, Atlantic City, N. J., Week of June 6, 1954.

National Industrial Service Association, Annual Convention, Hotel Statler, Detroit, Mich., June 13-17, 1954.

Illuminating Engineering Society, Midwestern Regional Conference, Jefferson Hotel, St. Louis, Mo., June 17-19, 1954.

Florida Chapter, IAEI, Joint Meeting with Southern Section, Tampa Terrace Hotel, Tampa, Fla., Oct. 25-27, 1954.

Southern Section, IAEI, Tampa Terrace Hotel, Tampa, Fla., Oct. 25-27, 1954. Conference chairman, R. A. Miller, Tampa.

Schoen brothers named Helwig representatives

APPOINTMENT of Carroll and Lloyd Schoen to represent Helwig Carbon Products Co., Milwaukee, Wis., in the Atlanta, Ga., area has been anounced. The Schoen brothers operate Electrical Insulation Supplies, Inc., 500 Means St., N. W., in Atlanta.

N. O. Electrical Ass'n adds four new members

FOUR NEW MEMBERS were voted into membership in the Electrical Association of New Orleans at this group's recent executive committee meeting at the International House in New Orleans.

These members are: Alvin A. Brinker, Jr., Joseph T. Clements, and Robert J. Davenport, all of Southern Bell Telephone & Telegraph Co., and J. Gordon Fraser, Knapp-Monarch Co.

News about people

W. A. Moss has been appointed Southeastern regional sales manager for the **A. B. Chance Co.**, Centralia, Mo. Mr. Moss will be in charge of the territory which covers Virginia, North Carolina, South Carolina, Florida, Georgia, Alabama, Tennessee and a few counties in Southwest Kentucky.

Mr. Moss originally came to Atlanta from the A. B. Chance office in San Francisco in 1938 and is well known in the Southern states.

This regional operation was brought about through the consolidation of sales for the companies, W. N. Matthews Corp., St. Louis, Mo., and Special Device Co., Cincinnati, Ohio, which were recently purchased by A. B. Chance.

W. A. Moss

Under the Southeastern region, **Fred B. Woods**, operating from headquarters in Richmond, will cover Virginia, North Carolina, and South Carolina. **John Dorsett**, with headquarters in Birmingham, will cover Alabama and Tennessee; and **J. A. Pollock**, operating from Bainbridge, Ga., will cover Georgia and Florida.

Graybar Electric Co., New York, N. Y., has appointed **R. F. Janda** district appliance sales manager at Houston, Texas, succeeding **R. H. Lloyd**, who has been transferred to the Northwestern District.

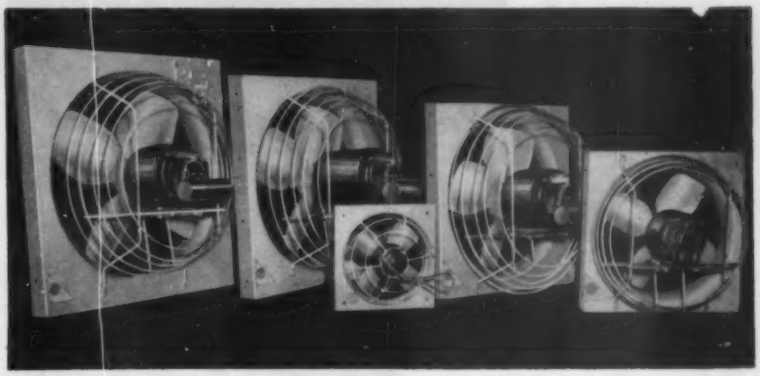
Mr. Janda has been with Graybar for 18 years. At the time of his transfer to Houston he was appliance sales manager for Graybar in Kansas City, and before that at St. Louis.

As district appliance sales manager for Houston, he will have charge of the appliance sales throughout the district, which includes branches in Corpus Christi and Beaumont, Texas; New Orleans and Baton Rouge, La.; and Jackson, Miss.

Duncan C. Kennedy has been appointed acting manager of the Lynchburg district of the **Appalachian Elec-**

"BUFFALO" PROPELLER FANS

Give Satisfaction On More Jobs

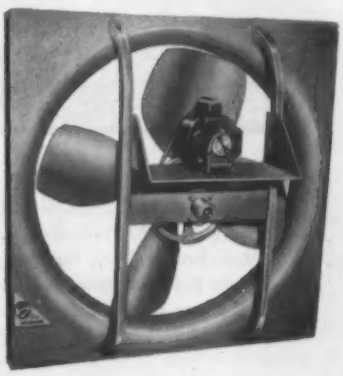


N-V BREEZOS . . . Quiet, Efficient, Sturdy!

Contractors, dealers, wholesalers are enjoying bumper sales, and pleasing many more customers with these versatile, propeller fans! Low in first cost, quiet, and very durable, NV-Breezos are easily installed in walls for free air delivery—or can be used efficiently against system pressures up to ½". 8", 12", 16", 18", 20" and 24" sizes. Write for Bulletin 3865.

BREEZ-AIR . . . The Attic Fan In Top Demand!

Now's the time to get set for the thousands of home owners in your area who are top prospects for cool comfort on those hot nights to come! Better write today for our price and installation sheet FM-20 on the completely NEW Breez-Air. In 24, 30, 36, 42, 48 and 54" sizes to suit every installation, they are the finest and most efficient fans in the long Breez-Air history!



BELT-AIR . . . The Big-Job Fan At Propeller Fan Prices

Not only is the new Belt-Air improved in quietness and performance, its size range is increased to include 24" to 84" fans—for jobs up to 90,000 cfm! And, like the NV-BREEZO line, it is available in a variety of protective coatings for special fume exhausting applications. Write for all the details on these husky, quiet, EASILY installed fans which can greatly increase your range of satisfied customers — and your sales. Don't delay. Write today!

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210 Mortimer Street Buffalo, New York

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

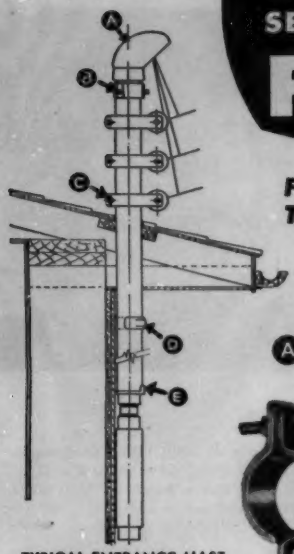
Sales Representatives in all Principal Cities

PANEL BREEZO FANS
BREEZ-AIR ATTIC FANS
BELTED VENT SETS
"L" BREEZO FANS
BELT-AIR FANS
"NV" BREEZO FANS

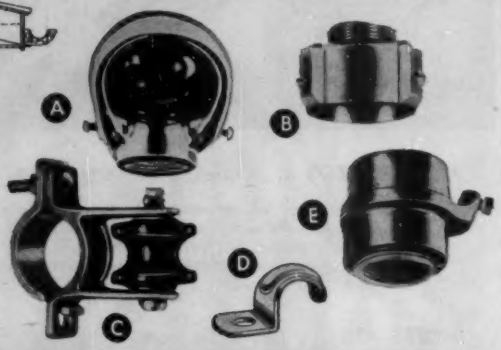
NOW- in Handy KITS!

M&W
SERVICE ENTRANCE MAST FITTINGS

FOR SERVICES THREE NO. 10 TO THREE NO. 2 INCLUSIVE



TYPICAL ENTRANCE MAST INSTALLATION



Make Installations *EASIER, FASTER* with these TIME-SAVER KITS!

NOW you can obtain ***ALL IN ONE PACKAGE*** all needed fittings for quick, complete entrance mast installations. Including (A) 1¼" Service Entrance Head, (B) Threadless Top Fitting 2" or 2½" to 1¼", (C) Heavy Duty Mal. Iron H. D. G. Ins. Bracket, (D) 2" or 2½" One Hole Strap, (E) Threadless Bottom Fitting for inside of 2" or 2½" conduit or pipe to 1" or 1¼". The one-bolt Insulator Bracket made of galvanized malleable iron. Insulators feature wet process porcelain spools with ½" pin and brass cotter. For fast, time-saving installations, order these M & W Kits:

FOR 2" Pipe or Conduit SM-200 Kit Consists of 1¼" Entrance Head, Pole Top Fitting, 3 Pipe Straps and Pole Bottom Fitting with 1¼" to 1" reducer.

SM-200-I Kit. Same as above except also includes three Insulator Brackets.

FOR 2½" Pipe or Conduit SM-250 Kit Consists of 1¼" Entrance Head, Pole Top Fitting, 3 Pipe Straps and Pole Bottom Fitting with 1¼" to 1" reducer.

SM-250-I Kit. Same as above except also includes three Insulator Brackets.

All parts furnished in kit form or separately. Ready for immediate delivery. See your jobber or write for 1954 Catalog.

• MANUFACTURERS OF WATERTIGHT SERVICE ENTRANCE CONNECTORS — GROUND CLAMPS & RODS — BX-ROMEX CONNECTORS — WIRE HOLDERS — SERVICE ENTRANCE FITTINGS — CONDUIT HANGERS & INSULATOR SUPPORTS.

M&W Electrical Fittings
The M. & W. ELECTRIC MFG. CO., Inc.
EAST PALESTINE, OHIO

tric Power Co., according to an announcement by **W. I. Whitefield,** manager of the company's Roanoke division. Mr. Kennedy succeeds the late G. Roberts Neubauer, who was district manager.

A native of Charleston, W. Va., Mr. Kennedy was employed by Appalachian at Charleston in 1932, following his graduation from West Virginia University. He transferred to the commercial department in Roanoke in 1933. Later, he transferred to Lynchburg as a distribution engineer, and was promoted to the post of assistant district manager in 1945.

John B. Crosby, formerly assistant manager, publicity, has been named advertising manager, **Crouse-Hinds Co.,** Syracuse, N. Y. With Crouse-Hinds for 11 years, Mr. Crosby began

John B. Crosby

as a member of the home office sales organization, later transferred as resident representative to Richmond, Va. In 1944, he returned to Syracuse as assistant to the sales manager before joining the advertising department in 1951.

L. C. Owen, Jr., has been appointed district credit manager of the **Graybar Electric Co.,** at Dallas, Texas, **W. E. Henges,** president, has announced. He replaces **W. F. Gay,** who is retiring after 34 years with the company.

Mr. Owen joined Graybar in 1948 in the operating department in Jacksonville. In 1950 he became creditman and the next year he was transferred to Miami as credit manager.

He is a graduate of Alabama Polytechnic Institute, and has been a director of the Miami Association of Credit Management.

Joel H. Watkins has been appointed sales manager of transformers and allied products of the **Kuhlman Electric Co.,** Bay City, Mich. Mr. Watkins is a graduate electrical engineer of the University of Virginia, Class of 1934, a member of the

American Institute of Electrical Engineers and a Certified Professional Engineer in the State of Virginia.

Columbia Cable & Electric Corp., Brooklyn, N. Y., manufacturers of electric cable and conduit, has announced the appointment of **Joe Akerman,** with headquarters at 813 Sistina Avenue, Coral Gables, as representative for the state of Florida.

Lithonia Lighting Products Co., Lithonia, Ga., announces the appointment of **Robert J. Kuzell** as sales manager.

Mr. Kuzell spent five years in the Engineering Department of the General Electric Co., Nela Park, Cleveland, Ohio, in new lamp development, research and promotion. Since that time, he has represented manufacturers of incandescent and fluorescent lighting fixtures in the Southeastern district.

Robert J. Kuzell

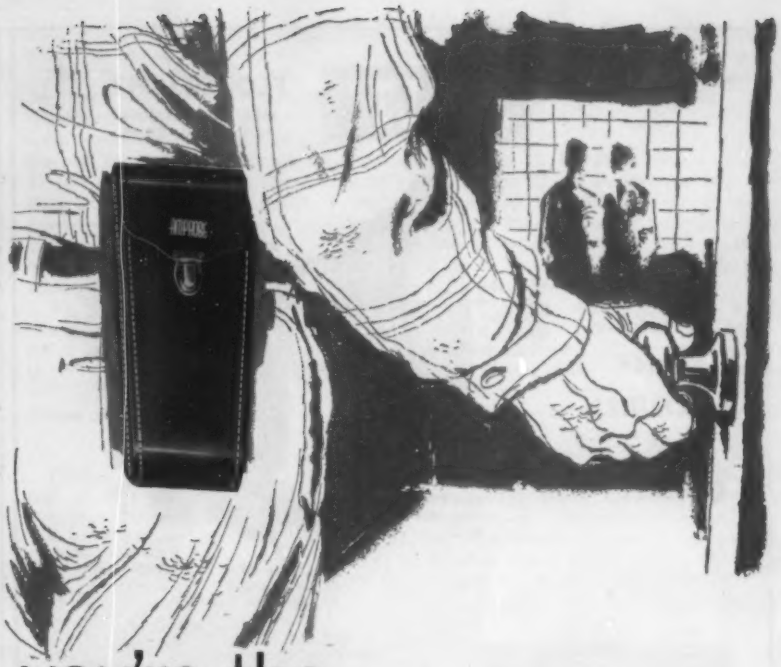
Mr. Kuzell is an electrical and lighting engineer and an active member of the Illuminating Engineering Society, Georgia Engineering Society and American Military Engineers.

Warren K. Clark has been appointed as **Westinghouse** electric heating application engineer for the Southeastern states.

Stuart L. Forsyth, manager of Westinghouse electric heating for homes, said Mr. Clark will be responsible for the sales of Westinghouse electric heating equipment in this territory with headquarters at the Westinghouse apparatus office at 401 Sixth Ave. South, Nashville, Tenn.

Reared in Knoxville, Tenn., Mr. Clark graduated from the University of Tennessee in 1950. He entered the U. S. Army immediately upon graduation and served for three years. After his discharge as a 2nd Lt., he joined Westinghouse.

The Trumbull Components Department of General Electric has named four men as managers of key marketing positions, according to **F. M.**



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when you walk in with an **AMPROBE®**

What the stethoscope is to the Doctor, the Amprobe snap-around volt-ammeter is to the electrician, contractor, plant maintenance man, refrigeration, motor and appliance serviceman.

With an Amprobe, you can measure current instantly without having to shut down equipment. You can measure voltage with instrument accuracy, on a full-size calibrated scale. All this with one rugged and inexpensive pocket-size tool!

Eliminate guesswork, save time and money on practically every call, reduce expensive call-backs, gain respect as a well-equipped professional—"Amprobe" it! You'll wonder how you ever got along without one.

Write for valuable service bulletins showing how to save time and money with an Amprobe. Mail coupon to: PYRAMID INSTRUMENT CORPORATION, LYNBROOK, NEW YORK.
(Export Div.: 458 Broadway, New York 14).

There is an Amprobe for every job, every budget:

AMPROBE Jr.
Now every man can afford to carry an Amprobe. 7 models from 0-10 to 0-100 amps; choice of 0-125/250 or 0-150/600 volt A-C range. $19.85

AMPROBE 300
The ideal Amprobe model for all-around work. Covers 6 ammeter ranges up to 300 amps, and 3 volt-meter ranges up to 600 volts A-C. $49.50

AMPROBES 600 & 1200
Similar to 300, but designed to handle extra-heavy loads—up to 600 and 1200 amps A-C respectively. Model 600 is $59.50. Model 1200 is $67.50.

Send for these free Amprobe service bulletins:

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snap-around volt-ammeters

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Please send me the Amprobe service bulletins checked below:

- ☐ *How to cut costs and land more jobs*
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- ☐ *Electrical servicing of hermetic units*

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ALL ALUMINUM ENCLOSED TYPE

WITH THESE MANY FEATURES OF QUALITY

ALUMINUM REFLECTOR ALZAK FINISH
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ALUMINUM LENS HOLDING RING
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MALLEABLE PIPE CLAMP FITTINGS THOROUGHLY PLATED

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For years . . . throughout the entire trade . . . the American Metal Moulding Co. has stood as the by-word of quality Bonded Armored Cable. American is known as the foremost producer of strong, dependable cable of rugged, built-in durability. Be assured of the most efficient installations . . . ask for it by name!

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Atlanta, Georgia

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Dallas, Texas

Oglee, Trumbull Components marketing manager. The Trumbull Components Department was formed recently, along with the Distribution Assemblies Department, as a result of the expansion of G.E.'s former Trumbull Electric Department.

A. P. McGraw has been made manager—component sales; **J. D. Hopkins,** manager—product planning and marketing research; **J. A. Kelly,** manager—commercial service; and **H. S. Hill,** manager—internal sales.

Richard E. Jones has been appointed the direct factory representative for the **W. L. Jackson Manufacturing Co.,** Chattanooga, Tenn., manufacturer of water heaters and pressure pumps, for the states of Georgia, Florida and Alabama.

Mr. Jones will continue to be associated with the **J. A. Lloyd Factory**

Richard E. Jones

Sales Agency in Atlanta, Ga., but will handle only the Jackson line in the future.

He has been in the electrical business throughout the Southeastern states for a number of years, and is considered to be one of the deans of the Southeastern manufacturers' representatives.

W. L. Jackson Manufacturing Company has recently opened their new plant addition and is now in full production on water heater and pressure pump tanks.

R. A. Cuyler, industrial sales manager of the **Louisiana Power & Light Co.,** has been re-elected chairman of the New Orleans Chamber of Commerce Industrial Development Bureau.

F. W. Wehrheim, a thirty-three year veteran with the **Appleton Electric Co.,** Chicago, Ill., has been elected its vice-president in charge of sales, **Arthur I. Appleton,** president, has announced.

Mr. Wehrheim joined the company in 1920 as a stock control clerk, serving the company continuously in various sales capacities.

Mr. Wehrheim succeeds **E. A. Mur-**

ray who has resigned to return to his former employer, the American Steel and Wire Div., United States Steel Corp.

Murray J. Whitfield, president of **Revere Electric Manufacturing Co.,** Chicago, announces the appointment of **Stanley M. Starr** as manager of street lighting sales.

Mr. Starr is a graduate of electrical engineering from Iowa State College

Stanley M. Starr

and spent ten years with Westinghouse Electric Corp., and Westinghouse Electric International Co., before leaving to represent Revere in the Pittsburgh area. He was transferred to the Chicago office in an engineering capacity in 1953.

Appointment of **F. Lee Davis** as manager of industrial sales of the **Pyle-National Co.,** Chicago, has been announced by **C. H. Hobbs,** vice-

F. Lee Davis

president in charge of sales.

Mr. Davis, formerly Detroit district manager for Benjamin Electric Manufacturing Co., replaces **F. M. Currie,** now supervisor of outside sales at Pyle-National.

Gordon W. Evans, vice-president and general manager of the **Kansas Gas & Electric Co.,** has been elected president to succeed **Murray F. Gill,** who will continue as chairman of the board of directors.

Mr. Evans served with Public Service Company of Oklahoma and Oklahoma Power & Water Co., before becoming president of Missouri Edison Co., and the East Missouri Power Co. He joined Kansas Gas & Electric in 1947 as assistant to the president, became vice-president during the same year, and was named vice-president and general manager in 1949.

Mr. Gill became associated with the company in 1937. After serving as vice-president, he was named president and general manager in 1940 and became chairman of the board in 1949.

Furna E. Lott, who has operated out of Miami, Fla., as a manufacturer's agent for the past eight years, has been appointed to represent the

Furna E. Lott

Illuminating Division of **The Miller Company,** Meriden, Conn., in the state of Florida with the exception of Escambia, Okaloosa, Santa Rosa and Walton counties. Mr. Lott was formerly with the Georgia Power Company and electrical wholesalers. He has a broad background of lighting sales experience.

D. S. Leavitt, general manager of the **Nikoh Tube Co.,** Chicago, has announced that sales of Nikoh Electrical Metallic Tubing and Teletube products are now under the direction of **S. M. Pearl.** Mr. Pearl is assisted by **Harold Christensen, Jack Poncher,** and **Frank Broda.**

B. L. Cook, Houston, Texas, has been appointed representative for **Garcy Lighting** (Garden City Plating & Mfg. Co.), Chicago, Ill., in the Gulf Coast area of Texas.

Andrew Wassell has been assigned as a sales representative to the Charlotte, N. C., district office of **Allis-Chalmers'** general machinery division.

A 1951 graduate mechanical engineer of the University of Notre Dame, Mr. Wassell recently completed the Allis-Chalmers training course for graduate engineers.

George F. Hessler, vice-president in charge of all sales activities and a member of the board of directors and of the executive committee of the **Graybar Electric Co.,** died in Venice, Fla., on February 1. He was 64.

Mr. Hessler had for many years been a leader in the electrical industry. In 1952 and 1953 he was president of the National Association of Electrical Distributors. Active in the Association's organization since 1916, he had been a member of the executive committee and the board of governors. During World War II he represented all electrical distributors on a committee of electrical manufacturers formed to determine the basic war needs of the industry.

As a result of his work with NAED, Mr. Hessler received the James H.

George F. Hessler

McGraw Award for Electrical Men in 1952 for his World War II efforts resulting in Office of Price Stabilization regulations which "provided the relief necessary to permit the distributor to function effectively and provide the services necessary to the emergency."

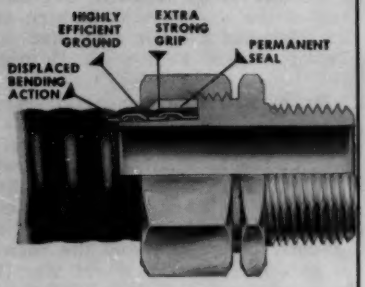
Mr. Hessler had been with Graybar for 48 years. In 1906, at the age of 17, he joined the Western Electric Company as a clerk in the purchase records department, rising through the ranks of Western Electric until the company's supply department became incorporated under the name of the Graybar Electric Company in January, 1926. He was at that time manager of the line material department.

In 1933, Mr. Hessler became assistant general sales manager and in 1940 he was appointed general sales manager. He became a director of the company in 1941. He was elected vice-president in January, 1952, and a member of the executive committee in March, 1942. Since March, 1949, Mr. Hessler had headed all of the company's sales activities.

it's new...

an improved connector for liquid-tight flexible conduit

(Sealtite or equivalent products)



PYLE-NATIONAL

"CT" series Connectors offer all these advantages

EXTRA STRONG GRIP
- Compression force applied against body shank—not against the conduit alone, making a vise-like clamp.
- Gripping is well behind end of flexible conduit for firm anchorage.
- Pliable seamless sleeve makes a plastic-to-plastic grip with the conduit sheath ... thereby avoids cutting and abrasion common to metal sleeves.

PERMANENT SEAL
- Plastic Sleeve and Conduit Sheath have equivalent physical characteristics therefore the seal will last the life of the conduit.

HIGHLY EFFICIENT GROUND
- Less than 10 millivolt drop.
- Tapered body shank, makes a firmly wedged contact with the flexible metal conduit.

DISPLACED BENDING ACTION
- Tapered body shank is elongated to extend beyond gland nut, thus avoiding short radius bends which shorten the life of the conduit sheath and the permanency of the joint.

"CT" series connectors can be installed assembled. Available in Straight, 45° and 90° types for ¾" to 2" conduit. Meet U/L and J.I.C. standards.

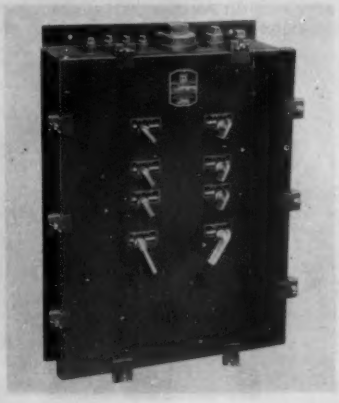
SINCE 1897

THE PYLE-NATIONAL CO.
1354 North Kostner Avenue
Chicago 51, Illinois

New products

Dust-tight panelboard

A COMPLETE NEW LINE of dust-tight circuit breaker lighting and distribution panelboards, especially designed for use in hazardous locations where dangerous combustible dusts are present, has been announced by the Square D Co., 6060 Rivard St., Detroit 11, Mich. These panelboards prevent the entrance of grain dust, carbon black, coal or coke dust and metal dust. They meet the National Electrical Code requirements and standards for Class II, Groups E, F and G hazardous locations and are fully approved by Underwriters for use in Class II, Groups E, F and G hazardous locations.



The panelboard enclosure consists of a formed steel box and front with welded corners. External, dust-tight handle mechanisms operate the branch circuit breakers. A heavy garlock packing is provided between the flanges of the box and the front. It is arranged to seal the opening with the help of heavy swing bolts and clamps. Conduit hubs for main and branch circuit cables are seam-welded to the top or bottom of the enclosure as desired.

All of these dust-tight panelboards incorporate Square D's thermal-magnetic, quick-make, quick-break circuit breakers for AC and DC service. Lugs only or main circuit breaker construction is available. Branch circuit breakers are provided in ratings from 15 to 50 ampere, single pole, and 15 to 100 ampere, two pole and three pole.

Insulation tester

A NEW high-voltage d-c insulation tester for use in maintaining electrical apparatus has been developed by the Line Material Company. The unit is portable. Utilizing the d-c leakage current principle for non-destructive testing, the new tester operates on a 115-volt, 60-cycle supply to provide adjustable d-c test voltages from 1 to 15 kv. It measures d-c insulation resistances up to 30,000 megohms.

The d-c tester has a microammeter for measuring d-c leakage current through the insulation being tested and a meter for indicating the volt-

age across the insulation. Two current ranges, 0 to 50 and 0 to 1000 microamperes, are provided. A calibration curve of d-c resistance in megohms vs d-c leakage current in microamperes at 15 kv is mounted on the instrument panel.

Curves of maximum allowable conduction current vs temperature are available with the tester to indicate insulation serviceability. Safety features are incorporated in the device to protect operating personnel.

For further information, write Line Material Co., Milwaukee 1, Wis.

Complete fan line

SIGNAL ELECTRIC Manufacturing Co., Menominee, Mich., has introduced three new fans to the trade. One model, the Jet Stream, has an air delivery of 2500 C.F.M. for Model HV-100, 3500 C.F.M. for Model HV-120. The air stream is fully adjustable, and a rotary switch offers three-speed selection. For all its power and performance, the Jet Stream is so quiet and mechanically perfect that its noise-level (decibel) rating is as low as an ordinary oscillator fan's. It carries a full five year guarantee.

The Signal Deluxe window fan, with its Signal-built electrically reversible motor, completely eliminates hand operations. It exhausts or takes in air instantly at the flick of a switch. In addition to fitting any standard window, this fan has a carrying handle which adds portable convenience. When the fan is not in use, its functionally thin streamlined design allows curtains to hang

straight. DWR-162, with 16 inch blade has an output of 2000 C.F.M. DWR-202, with giant 20 inch blade, has an output of 3800 C.F.M.

The third new Signal entry is a two-speed mobile fan whose 20 inch blades are 25 per cent larger than most mobile fans and give a certified air delivery of 3800 C.F.M. A new and practical right-angle han-

dle not only simplifies moving this giant fan-on-wheels, but permits a fully adjustable air stream: from 15 degrees below horizontal to vertical. Like all Signal portable fans, it is guaranteed for five years.

A complete range of portable fans, including oscillators, high velocity, floor, desk, window, and pedestal models, as well as vent and exhaust fans for every business, farm, industrial, or home need is offered in the new Signal line.

Integral hp motors

A NEW LINE of integral horsepower motors, designed specifically to provide smooth, economical changeover to the new standards prescribed by the National Electrical Manufacturers Ass'n., has been announced by the Electric Motor Division of the A. O. Smith Corp., Tipp City, Ohio.

The new Smith design is composed of rolled steel main frame construction with attached malleable iron base mounting as required. End frames are of durable cast iron. They are so constructed as to insure maximum ventilation to working interior parts, yet they meet requirements of "drip proof application."

Rotor diameter fans are employed, the blades being cast integral with pressure cast end rings and rotor bars. This assembly rides on ball bearings throughout the entire line. Quietness of operation is assured by the rigid construction and excellent alignment obtained through the use of cast iron end frames mated with rolled steel, seam-welded main frames.

This new line of motors will supplement the present line which ex-

Just one of hundreds of "Specification Grade" Slater Devices

in the new Slater 1954 CATALOG (Yours for the asking)

Slater
Lifetime wiring devices
SLATER ELECTRIC & MFG. CO., INC. WOODSIDE, N. Y.

a new policy...of importance to YOU!

EVERY Precision Transformer now backed by a 5-YEAR GUARANTEE

Protection and assurance you want, need and deserve! It's yours with Precision Transformer's industry-shaking 5-year guarantee! This long-term guarantee is Precision's way of proving complete confidence in the unexcelled dependability of their products. Be protected, be precise—order Precision!

¼ TO 1000 KVA
VOLTAGES TO 15KV

Write today for FREE Catalog and valuable technical data sheets.

These PTC dependability features are yours:
- Built to exceed latest NEMA standards
- Class "B" insulating materials
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- Accepted by leading engineers and industries

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CUT IT FASTER, EASIER, CHEAPER
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SAW ATTACHMENT
for
wood
fibre
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Just slip a Jiffy Saw Attachment on your ¼" or 5/16" high speed drill and zip quickly and easily through the most difficult cutting jobs. Jiffy is built to stand up under constant, on-the-job contractor or industrial use.

- No side torque or spinning
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- Improved dirt seal
- Needs no starting hole

JIFFY SAW KIT ATTACHMENT COMPLETE WITH
2500 R.P.M. ¼" Drill
10 Assorted blades
1 lb. No. 32 Grease
1 Grease Gun

Write today for information on the complete line of Jiffy labor savers.

The Jiffy Line
Saves TIME TROUBLE MONEY
ESTABLISHED 1915
Clyde W. Lint
2323 W. 18TH STREET • CHICAGO 8, ILL.

tends from ¼ through 150 hp and includes not only standard models but many mechanical and electrical variations from standard to meet customer's specific requirements.

Included in these variations is a complete line of all standard flange mountings, a line of vertical hollow shaft motors for turbine pumps, gear head motors of one through 15 hp and many others as required for design application.

Radiant heating cable

ELECTROMODE Corp., Rochester 3, N. Y., has announced the addition of radiant heating cable to the Electromode line. In this system, coils of the heating cable hidden in the ceiling silently radiate their heat downward. This system has the advantage of automatic temperature control by separate thermostat for each room.

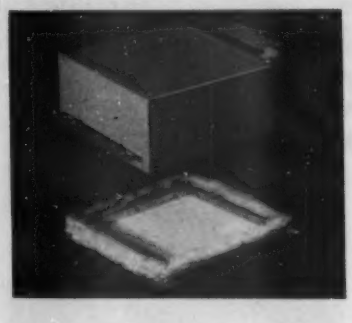
Electromode heating cables are a measured length of specially constructed and insulated electric wires; waterproof and non-corrosive. This

system never needs repairs and will outlast the building in which it is installed. A special feature of the cable is the Magic Seal which eliminates any possibility of streaks on the ceiling.

As this system eliminates the need for chimney, ducts, or even a basement, it simplifies house construction and speeds erection. Electromode cable heat is one of the easiest systems to install. The cable is simply stapled to the ceiling lath and covered with plaster. It can be installed in homes of any style, new or remodeled, one story or more, and now everyone can enjoy the luxury of this great advance in home heating.

Light leakage gasket

LIGHT LEAKAGE around fixture frames, a problem which has long plagued manufacturers of recessed lighting fixtures has now been corrected. Marvin Manufacturing Co., Los Angeles, Calif., makers of Marco Recessed Lighting Fixtures, has developed a fiber glass gasket which effectively stops light leakage. Five years of research went into perfect-



ing the gasket, and hundreds of architects and contractors were solicited for their suggestions.

The fiber glass conforms to any shape or to the irregularities of any ceiling. Not only does it stop light leakage but it also prevents dust and insects from accumulating inside the fixture. It's fireproof, and its tremendous resiliency assures a perfect, life-time seal. It's standard equipment now on all Marco recessed lighting fixtures—at no extra cost.

Lint-tight loom switch

A NEW LOOM switch, completely lint- and dust-tight and adaptable to loom, wall, or pedestal mounting, has been announced by the General

Electric Company's General Purpose Control Department.

Included in the new protective features of the switch is a die-cast aluminum slide mechanism which is built into the cover to engage the toggle handle. The slide is sealed snugly by spring pressure against a moisture-, fungus-, and insect-proof cotton-felt gasket.

For additional operating safety, a cork-neoprene gasket lines the inside edge of the cover to keep lint out. Resistant to moisture, abrasion, and many corrosive atmospheres, it is held in alignment by a Bakelite mounting plate.

Saddle-type terminals, straight through wiring, and ample wiring space speed installation, according to G-E engineers. The switch, which can be easily inverted in the cover for top or bottom power feed, is held firmly in the enclosure by only four screws.

Recessed spot fixture

THE PRESCOLITE Manufacturing Corp., Neshaminy, Pa., has announced a new recessed pin point spot lighting fixture.

Of particular interest to electri-

cal contractors, this new Prescolite fixture is available with either a two or a three inch light opening to provide dramatic high-lighting for residential or commercial installations.

Both the Prescolite 75-S-2 and 75-S-3 are lamped with 150 watt. Additional information is available from the company or its representatives.

Fluorescent lamp

A NEW DIMENSION in fluorescent color incorporating a revolutionary neutral light source in the upper limit of the visible wave length region, producing true color rendition throughout the visible spectrum, has been announced by the Duro-Test Corp., North Bergen, N. J.

The new light, called Super Delux 45, marks an important advance in fluorescent lighting because it does not distort colors from which it is reflected. Under the pure, white brilliance of this light, women's lips retain their full red color and in the barber chair, men no longer look like ghouls. The Super Delux 45 is flattering to merchandise as well as complexions as reds look redder, greens appear greener, and blues are bluer.

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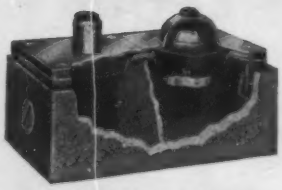

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Free bulletins

available to our readers

Large distribution transformers (250-500 kva) designed to cope with increased load densities on distribution systems are discussed in a new booklet (B-6134) available from the **Westinghouse Electric Corp.**, P. O. Box 2099, Pittsburgh 30, Pa.

Constructional and standardization characteristics of these distribution transformers (Type SL) are described and related to economic handling and operation procedures. For instance, low losses are made possible by use of Hipersil Cruciform cores. Oil life is prolonged, and shock and corrosion resistance is increased by use of sealed steel tanks which have I-beam bases and a triple coat of "flowed-on" paint.

Choices of windings, method of tap changing outside the tank, and accessories are also discussed.

A new catalog section has been released by **S & C Electric Co.**, 4435 Ravenswood Ave., Chicago 40, Ill., covering their **Type HSO Power Fuse.** The Type HSO is a boric acid fuse of medium interrupting capacity for application on circuits through 34,500 volts, where cutout protection is inadequate. It is a fuse of the dropout type-using an inexpensive refill unit, available in 1-, 2-, or 3-shot styles, and is now available on a single insulator for crossarm mounting.

The Type HSO Fuse is designed for service in line sectionalizing, fusing power and distribution transformers, protecting distribution feeders, and for circuit-breaker by-passing. Use of the fuse in these applications is described in detail in the new catalog.

The catalog also shows performance characteristics of the fuses at voltage ratings from 7,500 to 34,500 volts, and construction details of the 1-, 2-, and 3-shot styles that are available. Copies of the newly released Catalog Section 250 can be obtained by addressing the S & C Electric Co.

A new **Electrical Data Guide Book** has been issued by **Columbia Cable & Electric Corp.**, 255 Chestnut St., Brooklyn, N. Y., manufacturer of cable, conduit and building wire. The booklet measures 3½ inches x 6¼ inches for handy pocket reference and contains eight pages of valuable data.

Included, are tables showing the allowable current-carrying capacities of insulated conductors, full load currents of three-phase induction and synchronous type A.C. motors, the number of conductors in conduit or tubing, and others. In addition, the booklet contains specifications for Columbia's armored cable, E.M.T., non-metallic sheathed cable, type TW thermoplastic insulated wire and flexible steel conduit.

Copies of the Electrical Data Guide Book are available, without charge, by writing the Company.

A complete line of snap-around volt-ammeters is shown in the new **Amprobe Catalog No. 134**, now being made available by the **Pyramid Instrument Corp.**, Lynbrook, N. Y.

The catalog shows a model for every job and for every budget. It includes three new high-voltage Amprobe Junior models for industrial plant use. Four Amprobe Junior Models for electricians and service men. Multi-range Amprobes for higher current requirements. It describes the new Amprobe Energizer, an accessory which makes possible a quick current and voltage check at the outlet. Detailed specifications and features are shown.

The new catalog also describes a number of time and money-saving applications for the Amprobe.

Federal Electric Products Co., 50 Paris St., Newark 6, N. J., has issued a new booklet, Bulletin 502, describing **Federal Noark magnetic contactors.** The bulletin gives complete information on Federal's magnetic contractors including dimensions and weights.

Bulletin 502 magnetic contactors are designed to provide a safe, dependable means for repeated quick closing and opening of the electrical circuits controlling the sequence of operations in modern multiple action machines. They are electric switches in which the make and break action is controlled by an electro-magnet and are used for resistance loads as well as a wide variety of electric motor loads where overload protection is not required or is otherwise provided for.

Constructed to operate with a minimum of service attention, these magnetic contactors come in NEMA sizes 00, 0, 1, 2, 3, 4, 5, and 6 up to 600 amperes or 400 horsepower, 600 volts A. C. They are available for the four standard types of control circuits: remote control, local control, selector switch control, and three wire thermostat control.

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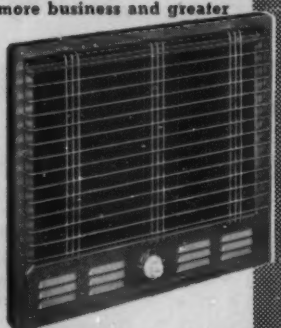

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Automatic Switch Co., Orange, N. J., designers and manufacturers of electromagnetic controls, is offering a pamphlet outlining their services and products for use on the power side of electronics systems. This pamphlet, (publication No. 528) titled **"When Normal Power Fails ..."** is available on request.

It discusses ASCO items designed and constructed to RETMA standards and covers such controls as automatic transfer switches, engine-generator starting units, differential relays, time delay relays and complete control panels. Information is given on such related subjects as: current surge tests, adequate lighting, relay protection; auxiliary equipment for engine generator controls, etc.

Maintenance

(*Continued from page* 38)

age age of the machine windings in your plant at some pre-determined number of years. Many companies have allowed this average to become too great resulting in a radical increase in the frequency of "breakdowns." This, of course, not only increases lost production time, but forces you to overhaul and repair your machines at inconvenient times.

Through the years, there has been a constant controversy among maintenance, production, and management personnel as to what complete standby units, such as machines and equipments, should be stocked as insurance against a major failure. A number of companies religiously analyze their standby requirements as follows:

When new machines are installed in their plant, the following steps are taken:

1. Calculation is made of repair time, assuming a major failure and assuming insurance parts such as coils, bearings, etc., are on hand.
2. Maintenance reviews this calculated repair time with the operating group to see if this repair time can or cannot be absorbed in the normal production schedule.
3. If repair time can be absorbed, then protection with the parts needed to carry out this major repair, such as coils, is sufficient.
4. If repair time cannot be absorbed, then protection with complete standby units must be considered. In most cases where standby units are stocked, it will not be necessary to stock the insurance parts, such as coils.

This is a condensed story of productive maintenance thinking. It would pay every manufacturing

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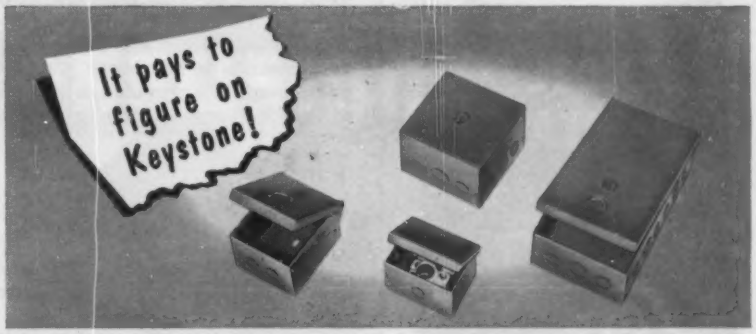

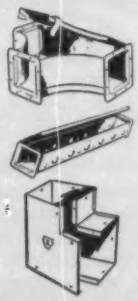

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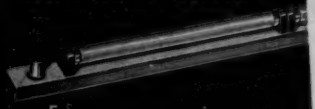

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company to put this thinking into action.

Let me make three "productive maintenance" suggestions with regard to the protection of machines and equipments that can be put in effect promptly.

1. Protect new or fairly new machines, critical to your operation, with major spare parts packaged for long time storage. Keep in mind that in the event of an unexpected breakdown of the machine, weeks are saved in the repair by having the spare parts available. Also, these same parts can be used later in the planned overhaul program.

2. List all the old machines in your plant and after studying the age, operation history and criticalness, establish a planned overhaul schedule. Again on these machines maintain a stock of major spare parts for protection before the overhaul date and to be available for use at the time of overhaul.

3. Establish and maintain an adequate stock of parts for routine maintenance including parts such as contact tips, bearings, brushes, etc.

Productive maintenance is an idea for all industry to follow, whether electric power generation, paper mill, chemical plant or cement plant or any industry producing vital products for military and civilian demands. Productive maintenance is for every kind of equipment. It provides a means of creating extra production at less cost.

Pole research

(*Continued from page* 44)

obtained by testing small clear specimens instead of full-size poles.

This program, Mr. Markwardt believes, will give pole purchasers greater assurance that poles have adequate strength and in many cases will save them money. A threefold saving can result: first, in the cost of the pole in the white; second, in the cost of preservative; and third, in freight. Since freight is a large part of the cost of poles, this saving is substantial as well as automatic.

One species of poles that is rated on the historical basis, Mr. Markwardt points out, represents 75 per cent of the pole usage, and if the test program provides data justifying the uprating of poles of this species, the savings to the purchasers could amount to millions of dollars annually.

Contributions for underwriting the cost of this investigation are being solicited and accepted by ASTM through a Ways and Means Committee headed by Col. L. G. Smith, Consolidated Gas, Electric Light and Power Co., Baltimore, Md. Substantial funds have already been received or allocated from individual companies and associations of pole producers, pole processors and treaters, pole users, including the American Telephone and Telegraph Company, the United States Independent Telephone Association, the Rural Electrification Administration, and the Forest Products Laboratory.

Trouble points

(*Continued from page* 39)

tor for defective work.

Defects in plans

Where an electrical contractor, as principal or subcontractor, is called upon to install wiring and equipment according to plans and specifications not drawn by him, and he faithfully follows those plans and specifications, the courts seem to agree that he is not liable for loss or damage resulting from defects in, or insufficiently of, the plans and specifications—provided, he has not guaranteed the plans and has not acted negligently. Supporting this statement is a decision of the Oklahoma Supreme Court. (Woods v. Amulco Products, 235 Pac. 2d 273.)

This statement of the law assumes that the electrical work performed to provisions of local municipal or state codes applicable to such construction.

If the electrical contractor knows —or ought to know—that plans and specifications are defective or insufficient, although not prepared by him, it would be very unwise to fail to draw attention of the owner or prime contractor to the defects or insufficiency, even though technically the electrical contractor might be in the clear without doing so. It is not only fair to the owner or the prime contractor; it may avoid involvement in an expensive lawsuit.

Signing unread papers

Very few people would be so incautious as to drink the contents of a bottle without assuring themselves as to the nature of the contents. But numerous are the people who habitually sign contracts without first determining just what

they are letting themselves in for.

The Texas Court of Civil Appeals merely echoed what appellate courts all over the country have declared frequently: where a provision in a written contract is clearly worded on a certain point, a signer will not be permitted, in court, to say that he did not believe that there was such a clause in the document when he signed it. (Spain v. Fuston, 242 S. W. 2d 892.) In short, it was no excuse that one signed a contract without knowing that it was "loaded."

However, it is a well established rule of law that a party to a contract can avoid its effect by proving that a particular clause was inserted through mistake made by both parties, or by proving that he was defrauded into signing by the other party's misrepresentation or trickery.

Cost plus contracts

No judge would be apt to disagree with the conclusion reached by the Mississippi Supreme Court, that one who undertakes construction work on a cost plus basis must use as much skill and care in doing the job as is the contract called for payment of a gross sum for the work. (Shaw v. Bula Cannon Shops, 38 So. 2d 916.)

Inconsistent clauses

One of the Tennessee Courts of Appeals applied an ABC rule of law in deciding that, where a contract is on a printed form but partly in writing and where there is an inconsistency between a printed clause and a written one, the courts will solve the doubt, if possible, by giving effect to the written clause over the printed one. (Tindell v. Bowers, 216 S. W. 2d 752.)

Implied conditions

In construction contracts certain agreements are implied without being explicitly stated. Probably, the most important of these implied conditions is one to the effect that the contractor will do his work in a good and workmanlike manner. It was so recognized by one of the Missouri Courts of Appeals in the case of Brush v. Miller, 208 S. W. 2d 816.

Reverse refrigeration

(*Continued from page* 41)

tested under operating load conditions at the factory, maintenance is negligible and janitor service on the buildings is reduced to a minimum. Redecorating costs, a normal

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part of school building upkeep, have also been sharply reduced.

Original cost reasonable

From the somewhat limited figures available, the cost of the original heat pump installations compares favorably with other modern automatic heating systems. Conservative estimates indicate that a boiler and radiator or convector system of the type now used in most schools would cost about $1.00 per square foot of building area. The heat pump installations were about 91 cents per sq. ft.

While the 91 cent cost did not include the cost of wells and water pumps, neither did the estimate for conventional heating equipment include the cost of a boiler room, chimney, and other construction needed to accommodate a boiler. It is apparent that a more exact comparison of the two types of systems would favor the heat pump from the standpoint of original cost.

Any comparison of first costs must consider the fact that heat pumps also provide summer air conditioning for portions of the building. Heat pumps serving public rooms, where summer cooling is required, are equipped with a special automatic change-over valve, so the mechanism can be instantly switched from winter to summer service.

While the individual heat pump, sized for Florida heating requirements does not have enough capacity to cool the same area in summer, provision can be made to combine the capacity of several units to cool auditoriums, the library, and offices in the building. Where complete summer cooling is required in the entire area heated, additional equipment may be added for this purpose.

Operating costs favorable

On the basis of both theoretical estimates and hard practical experience, operating costs of the heat pumps in the Florida schools, with an electric rate of two cents per kilowatthour, compares with automatic heating equipment burning fuel oil at 14 cents per gallon.

This does not seem possible until we understand that a heat pump is approximately 380 per cent efficient. Virtually all of the heat created by the operation of the refrigeration mechanism, known as the heat of compression, is absorbed into the system, *plus* the heat obtained from the water flowing from the ground. There are no

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CIRCUIT BREAKERS
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Latest in design to meet the most exacting lighting requirements. A variety of beam spreads for all applications.
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A low cost unit to meet minimum standards. Highly efficient and with a wide angle distribution to fit any need.
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combustion losses such as when fuel is burned and no stack losses up the chimney. All of the heat energy obtained goes into the building.

The cost of heating the 74th Street Elementary School with heat pumps was slightly over two cents per square foot for the season. The Gulf Beach Elementary School, of similar construction and using the most modern type of oil-fired heating equipment shows costs slightly under two cents per square foot for fuel. At the 74th Street School, however, considerable power was expended for testing at the beginning of the season. Under conditions encountered in Florida, it is safe to assume that heat pump operations, with all their attendant advantages, cost no more than other heating methods in common use.

Growing industry

While industry spokesmen have recently predicted that heat pumps will soon be installed at the rate of 200,000 units per year, Carl W. Millsom, general sales manager of Acme Industries, Inc., is even more optimistic.

"From our experience in Florida," Mr. Millsom reports, "a high proportion of all buildings requiring air conditioning will eventually use their refrigeration capacity for winter heating, and buildings like schools, which only require partial air conditioning, may be handled in the same manner. This situation opens a market that is almost unlimited."

Electric rug cleaning

(*Continued from page* 36)

order to avoid this difficulty. Now when the end of a long rug passes in front of the electric eye, it hits the pickup table which carries it to the take-off chute.

E. P. Hinkel and Co., Inc., has employed a machinist to supervise the operation in its entirety. When the machinist runs into any electrical difficulties, he calls on our man to help him. A regular procedure under the maintenance is to clean the cabinet every two weeks with compressed air to keep dust out of the relay and contactor contacts.

The installation of mechanized rug cleaning has stirred consider-

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able interest in the rug cleaning industry and representatives from all over the country visited the operation during a recent convention here and viewed with gratification the progress in these latest machines.

Residential wiring

(*Continued from page 32*)

the owner a safe job"—he continued, "one that he can live with, and won't blow fuses—the house electrician must make an installation with the proper number of circuits located in the right places. The key element in a house is versatile power. Often the electrician has no plan to work with and must circuit the job himself. Our men are hired through a local union and undergo an apprentice training program sponsored by the Contractor's Association. They also receive on-the-job training."

"The personality men of our organization are assigned to custom jobs," Mr. Rice said. "They must work closely with upper-bracket home builders and diplomacy is an essential requisite. These jobs often entail inter-com systems that run between $300 and $500, a telephone system that costs upward to $1,500, recessed lighting, attic fans and air conditioning units. Owners expect special treatment and get it from us."

Twin City Electric has a custom job under construction all the time, and three men are kept busy doing this type of work. While these installations compose a comparatively small percentage of the total volume of business, the firm feels they contribute to the over-all profit picture and have helped build the company's reputation for outstanding workmanship among builders and homeowners in the area.

C. L. Rice, who endows his associates with some of his own zest and zeal, started the business in 1917, in close-by Rosedale, Kansas. The business was built up to an organization of twenty-five men, then skidded to two men during the depression years.

Doors were closed during World War II when the company president helped wire air bases. In 1944, he reopened the business, incorporated it in 1946, and since then the volume of business has grown incessantly. According to Mr. Rice, volume of business in 1953 doubled the previous year. In 1947, the firm bought a small, but well-situated, building which has the advantages of being in a central location, close to suppliers, resulting in prompt deliveries, and near a trafficway leading to the downtown section of the city.

Adequate wiring

(*Continued from page 33*)

territory and that of its subsidiary, the Georgia Power and Light Co. It conducts group demonstrations for home owners so that they may enjoy the advantages and economies of their home appliances; it aids in kitchen planning and heating and air conditioning installations; it passes out literature at its own offices and at home shows on advantages of adequate wiring; it distributes the "Handbook of Residential Wiring Design" to contractors; it mails pertinent literature each month to electrical contractors; it posts house signs on homes that are being adequately wired and places decal signs on members' trucks and in their store windows, and it inspects homes that have been wired to determine whether they are eligible to receive an Adequate Wiring Certificate.

Every 60 days meetings of the Adequate Wiring Bureau are held to discuss problems of electrical wiring. There are talks by wiring contractors themselves, by E. B. Brant, secretary of the bureau, and occasionally by Mr. Ailstock. These meetings are well attended and the discussions are instructive.

The Florida Power Corporation obtains lists every day of building permits issued throughout its territory. It is the job of its residential salesmen to call on architects, builders, electrical contractors and home owners to see that the advantages of adequate wiring are thoroughly understood. Offers are made to provide suitable plans. The Florida Power Corp. estimates that the average cost for a house wiring job that will meet the adequate wiring specifications is only about 10 per cent more than for just barely complying with the National Electrical Code.

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Some power companies serving the milder portions of the South have refrained from advocating the use of electric heating devices because of the possibility of sudden overloads on their power lines during cold snaps. The Florida Power & Light Co., for example, has spent a large amount of money in its territory advocating installation of oil-burning equipment. The Florida Power Corporation, however, has been working for extension of use of electric heating equipment in winter months to be balanced by more extensive use of air conditioning in summer. Its air conditioning department has been instrumental in bringing about a large increase in installations of air cooling devices in the territory the company serves.

While there is nothing the company can do to prevent customers from using electric heaters or their kitchen ovens during cold spells, the homes that are wired for complete dependence on electric heat must have a load regulator installed, otherwise there is a charge of $1 per month per kw of heating installed whether it is used or not. A thermostat, set at 60 degrees, is placed on the north side of the building, as prevailing winds during coldest weather are from the north. It will be noted that in the accompanying estimate for a 9000 cu. ft. house the annual operating cost based on 70 degrees maintained during the normal season would be $60.

Specifications for insulation in homes to be heated electrically are fairly rigid to provide against heat losses. For example, in a concrete block house the blocks must be waterproofed on the inside with a vapor barrier next to plaster; the insulation must be 4-in. Rockwool or equal; terrazzo or concrete floor slab must be protected by a one-half inch tarred Celotex expansion joint and two layers of 15-pound mopped felt; awning or metal casement windows must meet American Window Manufacturers' Association specifications, and wood or glass doors must be weather-stripped.

A lighting demonstration room recently opened by the Florida Power Corporation (Electrical South, Dec., 1953, pages 48-49) has been a valuable adjunct to the work of the adequate wiring bureau. Although designed primarily for home owners, its many visitors have included electrical contractors, architects and home builders.

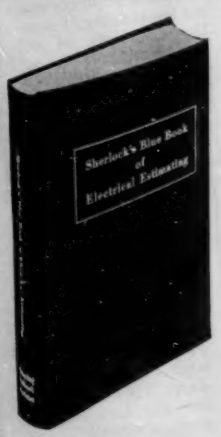
Economic comment

(*Continued from page 5*)

shows a high level of living costs that scarcely reflects this condition.

The answer is that in spite of the cracking of the price structure, such breaks do not show in B.L.S. figures. They are not shown in "list" prices but are the result of trading between buyer and seller. If they increase in any great proportion, then list prices will surely be affected. At that time there should be a sharp reduction in published cost-of-living figures.

Moreover, food prices that constitute about thirty per cent of consumer expenditures still hold firm (and even mount) due to increase in such special items as coffee, cocoa, and other unusually scarce products. In spite of this condition, however, if present circumstances persist prices should soften measurably by summer time.



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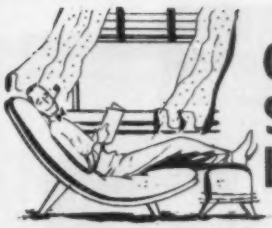

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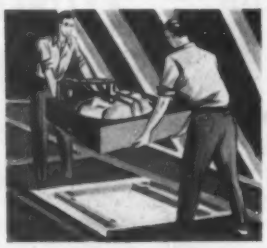

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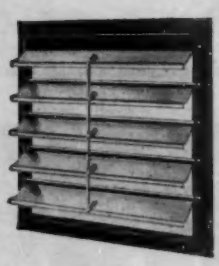

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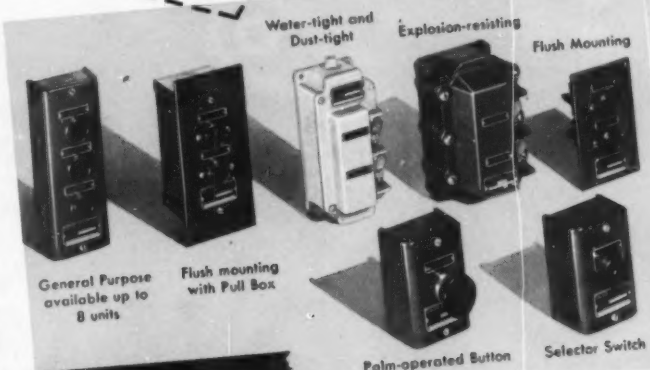

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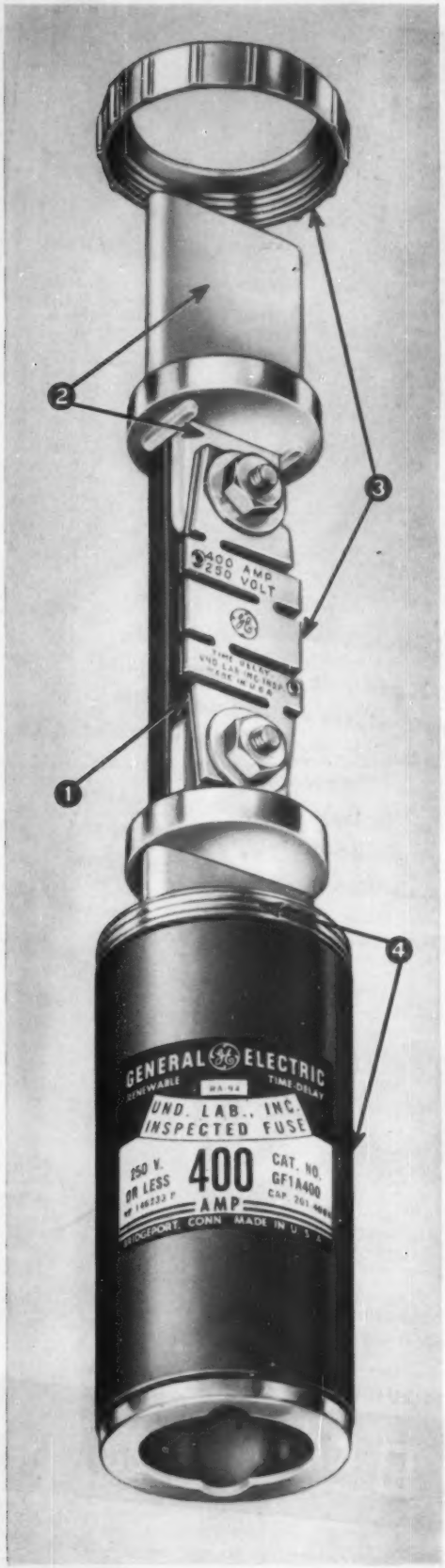

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